HP StorageWorks

XP24000/XP20000 Disk Array Owner Guide

Abstract

This guide describes the operation of the HP StorageWorks XP24000/XP20000 Disk Arrays. Topics include a description of the disk array hardware, instructions on how to manage the disk array, descriptions of the disk array control panel and LED indicators, troubleshooting, and regulatory statements. The intended audience is a storage system administrator or authorized service provider with independent knowledge of HP StorageWorks XP storage systems and Remote Web Console.

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1 Overview of the HP XP24000/XP20000 Disk Array

This disk array is part of the HP StorageWorks XP series of high-performance RAID-capable disk array systems used to store large quantities of data in an efficient and secure manner. XP disk arrays support multiple operating systems, platforms, and RAID groups. Advantages include:

- Continuous data availability
- Nondisruptive service and upgrades
- Connectivity
- Scalability
- Data integrity and high availability

Outstanding performance, capacity, and reliability

The HP StorageWorks XP24000/XP20000 Disk Arrays provide high performance, high capacity, and solid reliability in a large storage system that can start as small as a single frame and expand as your storage needs grow. Coupled with HP's comprehensive customer support, the XP24000/XP20000 disk arrays offer a safe data storage investment that will serve your needs for years to come.

Continuous data availability

XP disk arrays are designed for nonstop operation and continuous access to all user data.

The highest data availability is achieved by the following features:

- RAID1, RAID5, RAID6 (mixing RAID levels is allowed)
- Mirrored write cache
- Dual channel adapters (CHAs) and disk adapters (DKAs)
- Dual and concurrently active data and control paths through the array
- Split power domains on internal data paths
- Hot-pluggable boards
- Hot-pluggable fans, power supplies, and controllers
- Online upgradable firmware
- Remote health and alert monitoring by HP customer support using HP StorageWorks XP Continuous Track software and HP Insight Remote Support Advanced

The following optional features ensure the disk array meets your requirements for high availability:

- Advanced remote diagnostics
- Full solution (host-SAN-storage) support
- Full software and solution integration enabled by HP software products

NOTE:

Although access to data is not compromised, the failure of a key component can cause a temporary reduction in disk array performance.

Nondisruptive service and upgrades

Without disrupting normal disk array operations (if alternate pathing is used), an HP support representative can:

- Remove, service, repair, or replace hardware subassemblies
- Use the built-in service processor (SVP) to upgrade microcode
- Perform remote error monitoring, diagnosis, and maintenance

Alternate paths can be established using host failover software, alternate Fibre Channel paths, or both.

CAUTION:

The disk array has no user-serviceable components. The SVP does not include a keyboard or monitor and is not a customer-accessible component. Only an HP support representative should open the cabinets.

The HP StorageWorks XP C-Track monitoring software and HP Insight Remote Support Advanced product detects problems and automatically reports them to the HP Storage Technology Center (STC). An HP support representative can then verify the problem and perform the appropriate remote maintenance activity with no interruption to applications or hosts. For more information about C-Track, see "HP StorageWorks XP Continuous Track" on page 43. For more information about HP Insight Remote Support Advanced, see "HP Insight Remote Support Advanced" on page 43

Connectivity

The system can be configured to provide the following types of host connections:

- **Fibre Channel:** 8 or 16 ports per adapter pair, up to 4 Gbps, SW or LW
- **ESCON:** 8 ports per adapter pair, up to 17 MB
- **FICON:** 8 ports per adapter pair, up to 4 Gbps, SW or LW

Figure 1 shows a simple storage area network (SAN) containing an XP24000/XP20000 disk arrays.

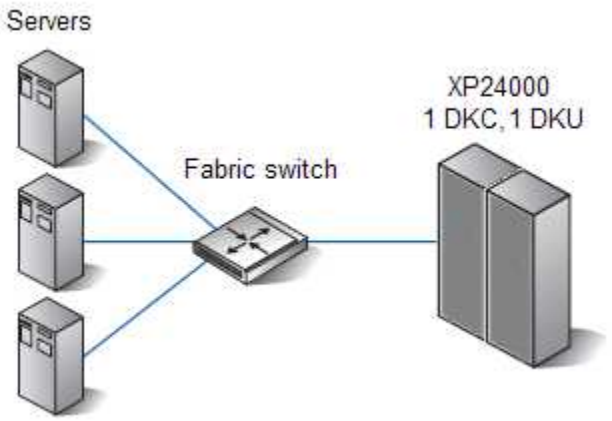


Figure 1 Disk array simplified SAN connection

Scalability

The disk arrays are scalable to accommodate your current and future storage capacity needs.

XP24000 basic configuration

The XP24000 configuration consists of a disk control frame (primary rack) that can have 128HDDs and zero to 4 disk array frames (DKU) that can each have 256 HDDs for a total of 1152 hard drives. The disk array provides a flexible configuration that can include:

- Number of installed channel options: Channel Adapters (CHAs) 1 to 14 adapters (each DKA set above 4 reduces the maximum number of CHAs by two)
  - Fibre Channel: up to 224 ports
  - ESCON: up to 112 ports
  - FICON: up to 112 ports
- Capacity of cache memory: 4 GB to 512 GB
- Up to 1152 HDDs

Your HP support representative can add DKUs and disk drives online with no interruptions to applications or hosts.

XP20000 basic configuration

The XP20000 configuration consists of a disk control frame (primary rack) that can have 120 HDDs, and a disk array frame (secondary rack) that can have 120 HDDs. The disk array provides a flexible configuration that can include:

- Number of installed channel options: 1 to 3 sets
- Capacity of cache memory: 4 GB to 128 GB
- Up to 240 HDDs/8 disk paths

In the basic configuration, the disk array consists of one primary 19–inch rack containing the following:

- One disk controller that consists of the channel adapters, disk adapters, cache memory adapters, shared memory adapters, and CSW
- Battery boxes and power supplies that supply power to the components

- One 60-disk chassis

Adding storage

You can add more disk chassis in this order: R0, R1, R2, and R3. Each disk chassis contains 60 hard disk drives.

Your HP support representative can add disk chassis and disk drives online with no interruptions to applications or hosts. Additional details about each rack follow.

Primary rack expansion

In addition to the basic disk chassis R0, you can expand the disk array in the primary rack as follows:

- Add 60-disk chassis R1 to the top space of the primary rack. This provides a total of up to 120 drives.

Secondary rack expansion

You can add a second 19-inch rack with additional disk units as follows:

- Add one 60-disk chassis to the second rack for a total of up to 180 drives
- Add a second 60-disk chassis to the second rack for a total of up to 240 drives

Flexibility

The new optional HP StorageWorks XP Thin Provisioning software significantly improves system flexibility while also decreasing storage costs. Using this solution, you begin operation with a global pool of LDEVs that are not assigned to physical storage. The disk arrays add virtual capacity from the pool of LDEVs on the fly as data is written, and only at that time is physical capacity assigned to LDEVs and consumed.

Later, if you need additional storage capacity, you can add it without downtime. To create new LDEVS, the system simply continues to use LDEVs from the pool, assigning them to the new physical storage automatically as required.

For more information, see the *HP StorageWorks XP24000/XP20000 Thin Provisioning User Guide*.

Data encryption

HP StorageWorks DKA Encryption License Key provides physical disk encryption (AES-256) compatible with open and mainframe systems. Encryption can be applied to some or all internal drives with no throughput or latency impacts for data I/O and with little or no disruption to existing applications and infrastructure. HP DKA Encryption License Key includes integrated key management functionality that is both simple and safe to use. For more information, see the *HP StorageWorks XP24000/XP20000 Disk Encryption User Guide* or contact your HP account representative.

HP XP24000/XP20000 product contents

The HP XP24000/XP20000 disk array products include hardware, software, services, and support. Some additional components are required and others are optional, as described in this section. For the most current product information, visit the HP website:

http://h18006.www1.hp.com/storage/enterprisestorage.html

Web-based array management

The XP disk arrays come with HP StorageWorks XP Remote Web Console, a Java-based interface that runs on the SVP and enables you to manage one disk array. For managing multiple arrays, the optional HP StorageWorks XP Command View Advanced Edition software runs on a Windows-based server and can be accessed using remote web-based clients. These software solutions enable comprehensive disk array management.

Operating systems

The disk arrays support these operating systems:

- HP-UX
- Linux
- Windows
- Sun Solaris
- IBM AIX
- OpenVMS
- Tru64
- NonStop
- VMware
- Novell NetWare
- Selected mainframe systems

For the latest information on supported operating systems and versions, contact your HP support representative or see the HP StorageWorks Single Point of Connectivity Knowledge (SPOCK) website:

http://spock.corp.hp.com/

External storage

The XP disk array connects to the following external storage systems and can provide access to and management of external volumes:

- HP StorageWorks XP48, XP128, XP256, XP512, XP1024, XP10000, and XP12000 disk arrays
- HP StorageWorks Modular Smart Array MSA1000 and MSA1500
- HP StorageWorks EVA3000, EVA4000, EVA 4400, EVA5000, EVA6000, EVA6100, and EVA8000 EVA 8100, disk arrays
- Specific disk array models of other manufacturers. Consult your HP representative for details.

For more information about HP external storage, see the *HP StorageWorks XP24000/XP20000 External Storage Software User Guide*.

Included components

The base XP disk array includes the following hardware, software, services, and support:

- One DKC
- Basic redundant power supplies and backup batteries for base cache and shared memory
- HP microcode
- Modem

- XP Continuous Track software
- Remote Web Console software
- An XP Disk Array Documentation CD (includes owner's guide, OS configuration guides, and software user guides)
- Site preparation services
- Installation and configuration services
- Proactive support for one year
- Reactive hardware support for two years
- Software support for one year (included with software title)

Required additional components

- Cache memory
- Shared memory
- DKA pairs
- CHA pairs
- Hard disk drives
- HP StorageWorks XP Array Manager software

Software

HP offers a full suite of software for the HP StorageWorks XP disk arrays. Sophisticated software packages enable these capabilities so you can take full advantage of the array's power:

- Manage the disk array configuration
- Monitor the array performance
- Optimize your disk array and IT resources
- Improve overall storage availability
- Simplify disaster recovery
- Improve data security

Before installing a software package, refer to the software product documentation to verify equipment requirements.

To learn more about HP software products, or to obtain software updates, visit the HP website and navigate to XP storage software:

http://www.hp.com

Table 1 Remote Web Console-based software for XP24000/XP20000 disk arrays

Name	Description	Document
HP StorageWorks Remote Web Console HP StorageWorks Remote Web Console Error Codes	Obtains system configuration and status information and sends user-requested commands to the storage systems. Serves as the integrated user interface for all Resource Manager components.	*HP StorageWorks XP24000/XP20000 Remote Web Console User Guide* *HP StorageWorks XP24000/XP20000 Remote Web Console Error Codes*

Name	Description	Document
HP StorageWorks DKA Encryption License Key	Enables the user to implement encryption for both open-systems and mainframe data.	*HP StorageWorks XP24000/XP20000 Disk Encryption User Guide*
HP StorageWorks XP Thin Provisioning Software	Provides "virtual storage capacity" to simplify administration and addition of storage, eliminate application service interruptions, and reduce costs. See the *HP StorageWorks XP24000/XP20000 Thin Provisioning Software User Guide*.	*HP StorageWorks XP24000/XP20000 Thin Provisioning Software User Guide*
HP StorageWorks XP Continuous Access Software Hitachi TrueCopy™ for Mainframe	Enables the user to perform remote copy operations between storage systems in different locations. TrueCopy provides synchronous and asynchronous copy modes for open-system and mainframe data.	*HP StorageWorks XP24000/XP20000 Continuous Access Software User Guide* *Hitachi TrueCopy™ for Mainframe User Guide: HP XP24000 Disk Array, HP XP20000 Disk Array*
HP StorageWorks XP Business Copy Software Hitachi ShadowImage™ for Mainframe	Allows the user to create internal copies of volumes for purposes such as application testing and offline backup. Can be used in conjunction with XP Continuous Access to maintain multiple copies of data at primary and secondary sites.	*HP StorageWorks XP24000/XP20000 Business Copy Software User Guide* *Hitachi ShadowImage™ for Mainframe User Guide: HP XP24000 Disk Array, HP XP20000 Disk Array*
HP StorageWorks XP for FlashCopy Mirroring Software	Provides compatibility with the IBM FlashCopy mainframe host software function, which performs server-based data replication for mainframe data.	*HP StorageWorks XP24000/XP20000 for FlashCopy Mirroring Software User Guide*
HP StorageWorks XP Continuous Access Journal Software Hitachi Universal Replicator™ for Mainframe	Provides a RAID storage-based hardware solution for disaster recovery which enables fast and accurate system recovery, particularly for large amounts of data which span multiple volumes. Using XP Continuous Access Journal, you can configure and manage highly reliable data replication systems using journal volumes to reduce chances of suspension of copy operations.	*HP StorageWorks XP24000/XP20000 Continuous Access Journal Software User Guide* *Hitachi Universal Replicator™ for Mainframe User Guide: HP XP24000 Disk Array, HP XP20000 Disk Array*
HP StorageWorks XP for Compatible Extended Remote Copy (XRC) Software	Provides compatibility with the Extended Remote Copy (XRC) mainframe host software function, which performs server-based asynchronous remote copy operations for mainframe LVIs.	*HP StorageWorks XP24000/XP20000 for Compatible Extended Remote Copy (XRC) Software User Guide*
HP StorageWorks XP Snapshot Software	Provides ShadowImage functionality using less capacity of the storage system and less time for processing than ShadowImage by using "virtual" secondary volumes. XP Snapshot is useful for copying and managing data in a short time with reduced cost. ShadowImage provides higher data integrity.	*HP StorageWorks XP24000/XP20000 Snapshot User Guide*

Name	Description	Document
HP StorageWorks XP External Storage Software	Realizes the virtualization of the storage system. Users can connect other storage systems to the XP24000/XP20000 disk array and access the data on the external storage system over virtual devices on the XP24000/XP20000 disk array. Functions such as TrueCopy and Cache Residency can be performed on the external data.	*HP StorageWorks XP24000/XP20000 External Storage Software User Guide*
HP StorageWorks XP Disk/Cache Partition Software	Provides storage logical partition and cache logical partition: Storage logical partition allows you to divide the available storage among various users to reduce conflicts over usage. Cache logical partition allows you to divide the cache into multiple virtual cache memories to reduce I/O contention.	*HP StorageWorks XP24000/XP20000 Disk/Cache Partition User Guide*
HP StorageWorks LUN Manager	Enables users to configure the Fibre Channel ports and devices (LUs) for operational environments (for example, arbitrated-loop and fabric topologies, host failover support). The security function allows users to restrict host access to data on the disk arrays. Mainframe users can restrict host access to LVIs based on node IDs and logical partition (LPAR) numbers.	*HP StorageWorks XP24000/XP20000 LUN Manager User Guide*
HP StorageWorks SNMP Agent	Provides support for SNMP monitoring and management. Enables SNMP-based reporting on status and alerts. SNMP agent on the SVP gathers usage and error information and transfers the information to the SNMP manager on the host.	*HP StorageWorks XP24000/XP20000 SNMP Agent Reference Guide*
HP StorageWorks Audit Log	Provides detailed records of all operations performed using Remote Web Console (and the SVP).	*HP StorageWorks XP24000/XP20000 Audit Log User and Reference Guide*
HP StorageWorks LUN Expansion	Allows open-system users to concatenate multiple LUs into single LUs to enable open-system hosts to access the data on the entire storage system using fewer logical units.	*HP StorageWorks XP24000/XP20000 LUN Expansion User Guide*
HP StorageWorks Virtual LVI/LUN	Enables users to convert single volumes (LVIs or LUs) into multiple smaller volumes to improve data access performance.	*HP StorageWorks XP24000/XP20000 Virtual LVI/LUN (VLL) and Volume Shredder User Guide*
HP StorageWorks Cache Residency Manager	Allows users to lock and unlock data into cache in real time to optimize access to your most frequently-accessed data.	*HP StorageWorks XP24000/XP20000 Cache Residency Manager User Guide*
HP StorageWorks XP for Compatible Parallel Access Volumes Software	Enables the mainframe host to issue multiple I/O requests in parallel to single LDEVs in the storage system. Compatible PAV provides compatibility with the IBM Workload Manager (WLM) host software function and supports both static and dynamic PAV functionality.	*HP StorageWorks XP24000/XP20000 for Compatible Parallel Access Volumes Software User Guide*

Name	Description	Document
HP StorageWorks Volume Security	Allows users to restrict host access to data on the storage system. Mainframe users can restrict host access to LVIs based on node IDs and logical partition (LPAR) numbers.	*HP StorageWorks XP24000/XP20000 Volume Security User Guide*
HP StorageWorks Database Validator	Prevents corrupted data environments by identifying and rejecting corrupted data blocks before they are written onto the data drives, thus minimizing risk and potential costs in backup, restore, and recovery operations.	*HP StorageWorks XP24000/XP20000 Database Validator User Guide*
HP StorageWorks Data Retention Utility HP StorageWorks XP Volume Retention Manager	Allows users to protect data from I/O operations performed by hosts. Users can assign an access attribute to each logical volume to restrict read and/or write operations, preventing unauthorized access to data.	*HP StorageWorks XP24000/XP20000 Data Retention Utility User Guide* *HP StorageWorks XP24000/XP20000 Volume Retention Manager User Guide*
HP StorageWorks Performance Monitor	Performs detailed monitoring of storage system and volume activity.	*HP StorageWorks XP24000/XP20000 Performance Monitor User Guide*
HP StorageWorks XP Performance Control Software	Allows open-system users to designate prioritized ports (for example, for production servers) and non-prioritized ports (for example, for development servers) and set thresholds and upper limits for the I/O activity of these ports.	*HP StorageWorks XP24000/XP20000 Performance Control User Guide*
HP StorageWorks Volume Shredder	Enables users to overwrite data on logical volumes with dummy data.	*HP StorageWorks XP24000/XP20000 Virtual LVI/LUN (VLL) and Volume Shredder User Guide*

Table 2 Host/Server-based software for the XP24000/XP20000 disk arrays

Name	Description	Document
XP RAID Manager	Enables open-system users to perform data replication and data protection operations by issuing commands from the host to the storage systems. The RAID Manager software supports scripting and provides failover and mutual hot standby functionality in cooperation with host failover products.	*HP StorageWorks XP RAID Manager User Guide*
XP for Data Exchange Software	Enables users to transfer data between mainframe and open-system platforms using the FICON and/or ESCON channels, for high-speed data transfer without requiring network communication links or tape.	*HP StorageWorks XP for Data Exchange Software User GuideHP StorageWorks XP for Data Exchange Code Converter User Guide (336pp)*
Cache Residency Manager	Enables users to perform Cache Residency Manager operations from the mainframe host system. Cache Residency Manager allows you to place specific data in cache memory to enable virtually immediate access to this data.	*HP StorageWorks XP24000/XP20000 Cache Residency Manager User Guide*

Name	Description	Document
Hitachi Dataset Replication (Logical Volume Divider)	Operates together with the XP Business Copy feature. Rewrites the OS management information (VTOC, VVDS, and VTOCIX) and dataset name and creates a user catalog for a XP Business Copy target volume after a split operation. Provides the prepare, volume divide, volume unify, and volume backup functions to enable use of an XP Business Copy target volume.	*Hitachi Dataset Replication User Guide: Logical Volume Divider*

Table 3 XP Command View Advanced Edition Software for XP24000/XP20000 disk arrays

Name	Description	Document
HP StorageWorks XP Command View Advanced Edition Software	Enables users to manage the storage systems and perform functions (e.g., LUN Manager, XP Business Copy) from virtually any location via the Command View Advanced Edition software Device Manager web client, command line interface (CLI), and/or third-party application.	*HP StorageWorks XP Command View Advanced Edition software Device Manager agent installation and configuration guide HP StorageWorks XP Command View Advanced Edition software server administrator guide for Device Manager and Provisioning Manager HP StorageWorks XP Command View Advanced Edition software quick installation guide HP StorageWorks XP Command View Advanced Edition software Device Manager Help HP StorageWorks XP Command View Advanced Edition software Device Manager Help*
XP Thin Provisioning Software	Designed to handle a variety of storage systems to simplify storage management operations and reduce costs. Works together with Command View Advanced Edition software Device Manager to provide the functionality to integrate, manipulate, and manage storage using provisioning plans.	*HP StorageWorks XP24000/XP20000 Thin Provisioning Software User Guide*
XP for Business Continuity Manager Software	Enables mainframe users to make Point-in-Time (PiT) copies of production data, without interrupting the application or causing any disruption to end-user operations; for such uses as application testing, business intelligence, and disaster recovery for business continuance.	*HP StorageWorks XP for Business Continuity Manager Software Installation GuideHP StorageWorks XP for Business Continuity Manager Software MessagesHP StorageWorks XP for Business Continuity Manager Software Reference GuideHP StorageWorks XP for Business Continuity Manager Software User Guide*
HP StorageWorks XP Replication Manager Software	Supports management of storage replication (copy pair) operations, enabling users to view (report) the configuration, change the status, and troubleshoot copy pair issues. Replication Manager is particularly effective in environments that include multiple storage systems or multiple physical locations, and in environments in which various types of volume replication functionality (such as XP Business Copy and XP Continuous Access) are used.	*HP StorageWorks XP Replication Manager Software HelpHP StorageWorks XP Replication Manager software installation and configuration guideHP StorageWorks XP Replication Manager software user guide*

Name	Description	Document
HP StorageWorks XP Performance Advisor Software	Collects, monitors, and displays in-depth performance data at the component level (LDEV, CHA, DKA, and DKC). Includes XP-Watch, a real-time troubleshooting tool to identify the root cause of performance issues.	*HP StorageWorks XP Performance Advisor Software command-line user interface user guideHP StorageWorks XP Performance Advisor Software installation guideHP StorageWorks XP Performance Advisor Software troubleshooting guideHP StorageWorks XP Performance Advisor Software user guide*

2 Hardware description of the HP XP24000/XP20000 Disk Array

The HP StorageWorks XP series of disk arrays are high-performance RAID-capable disk array systems used to store large quantities of data in an efficient and secure manner.

There are no single points of failure in the disk arrays. They include redundant logic assemblies, controllers, power supplies, and dual-ported RAID disk drives, all of which can be removed or replaced without interrupting access to data. This chapter describes the physical components of the disk array.

△ CAUTION:

Only your HP support representative can remove or replace hardware.

XP24000 system architecture

As Figure 2 shows, the basic XP24000 disk array consists of a DKC cabinet containing two main sections: a logic box and an HDD box.

The logic box includes channel adapters (CHA) that provide server and other interfaces, disk adapters (DKA) for controlling disk drives, cache memory adapters (CMA), and shared memory adapters (SMA).

The HDD box contains the disk drives and a Fibre switch that interfaces the drives to the DKAs. Additional disk drives can be added by installing up to four optional DKU cabinets containing multiple additional HDD boxes.

Components interact by way of the data paths shown in the figure.

Also included but not shown in Figure 2 are the AC-DC power supplies and backup batteries.

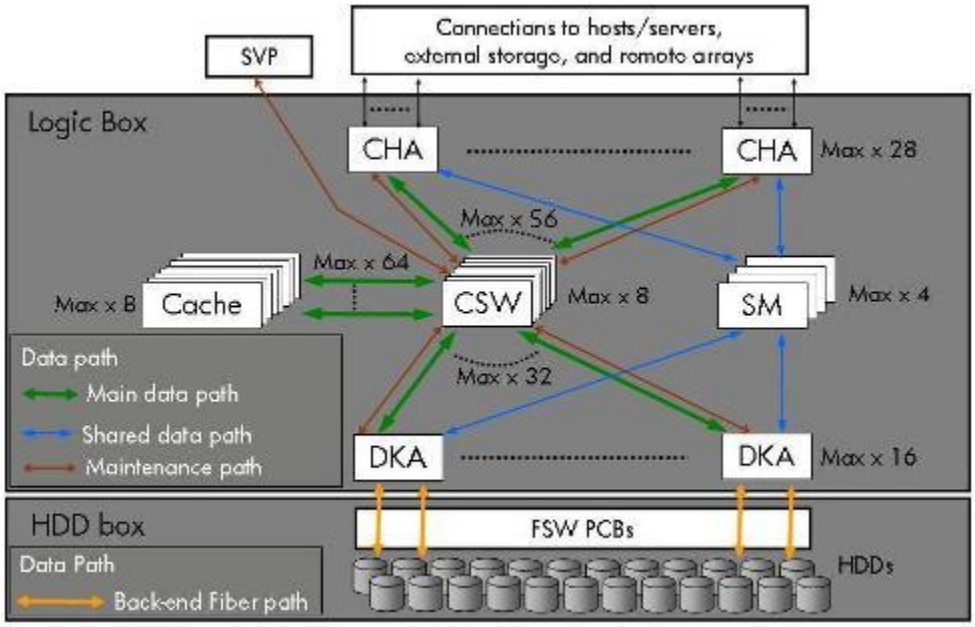


Figure 2 XP24000 system architecture

XP20000 system architecture

Figure 3 shows, the basic XP20000 disk array consists of three main sections: the power supply, a DKC, and a DKU.

The power supply section consists of the AC-DC power supplies and battery boxes.

The DKC consists of the channel adapters (CHAs), disk adapters (DKAs), cache memory adapters (CMAs), and shared memory adapters (SMAs).

The DKU consists of the disk drives and Fibre Channel switches (FSW, not shown).

Each component is connected with the cache paths, SM paths, and/or disk paths shown in the figure.

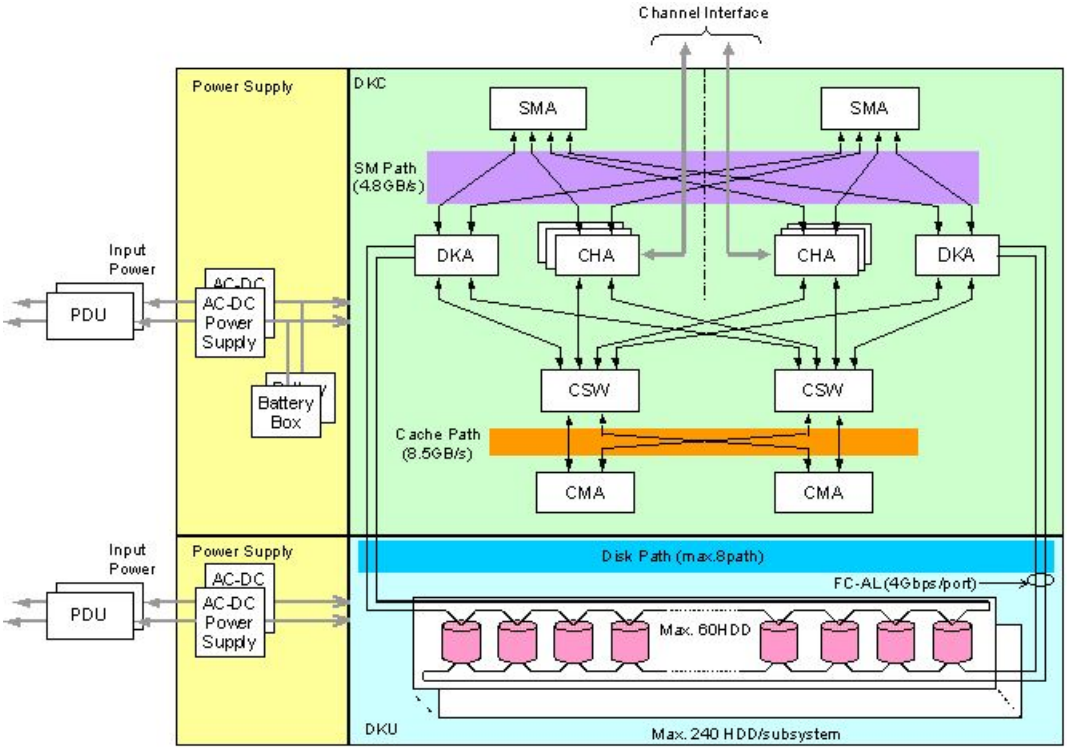


Figure 3 XP20000 system architecture

Physical assemblies

The XP24000 disk array includes the following major hardware assemblies (see Figure 4):

- One disk control frame (DKC)
- Zero to four disk array frames (DKUs)

To monitor and manage the array, a management server supplied by the customer is also required.

The following figure shows the disk array with the maximum of four DKUs. The DKC alone constitutes the minimum configuration.

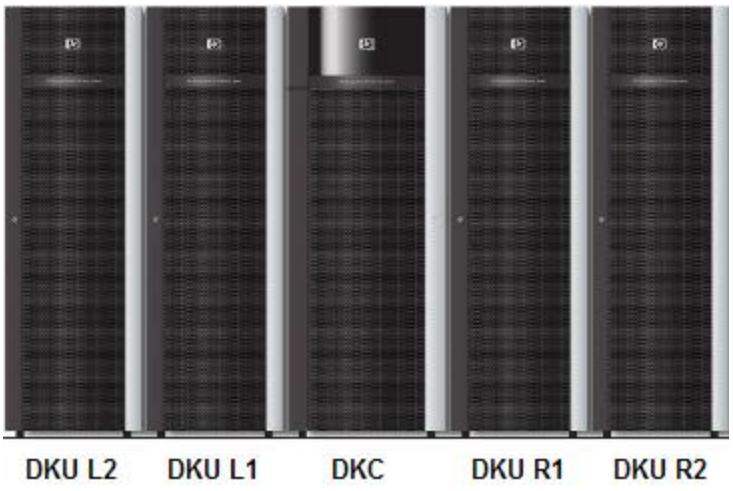


Figure 4 Disk array frames

Disk control frame

The DKC controls the disk array. It contains the control panel, connection hardware, power supplies, SVP, and control boards for the disk array. It also contains up to 128 disk drives for the XP24000 and contains up to 120 disk drives for the XP20000.

DKC clusters

As the following figure shows, power and PCBs in the DKC are organized into two independent and redundant clusters. Clustering helps ensure that if power or a PCB associated with one cluster stops operating, the power and PCBs associated with the other cluster can continue to operate and support the disk drives.

Cluster 1 consists of the assemblies at the front of the DKC.

Cluster 2 consists of the assemblies at the rear.

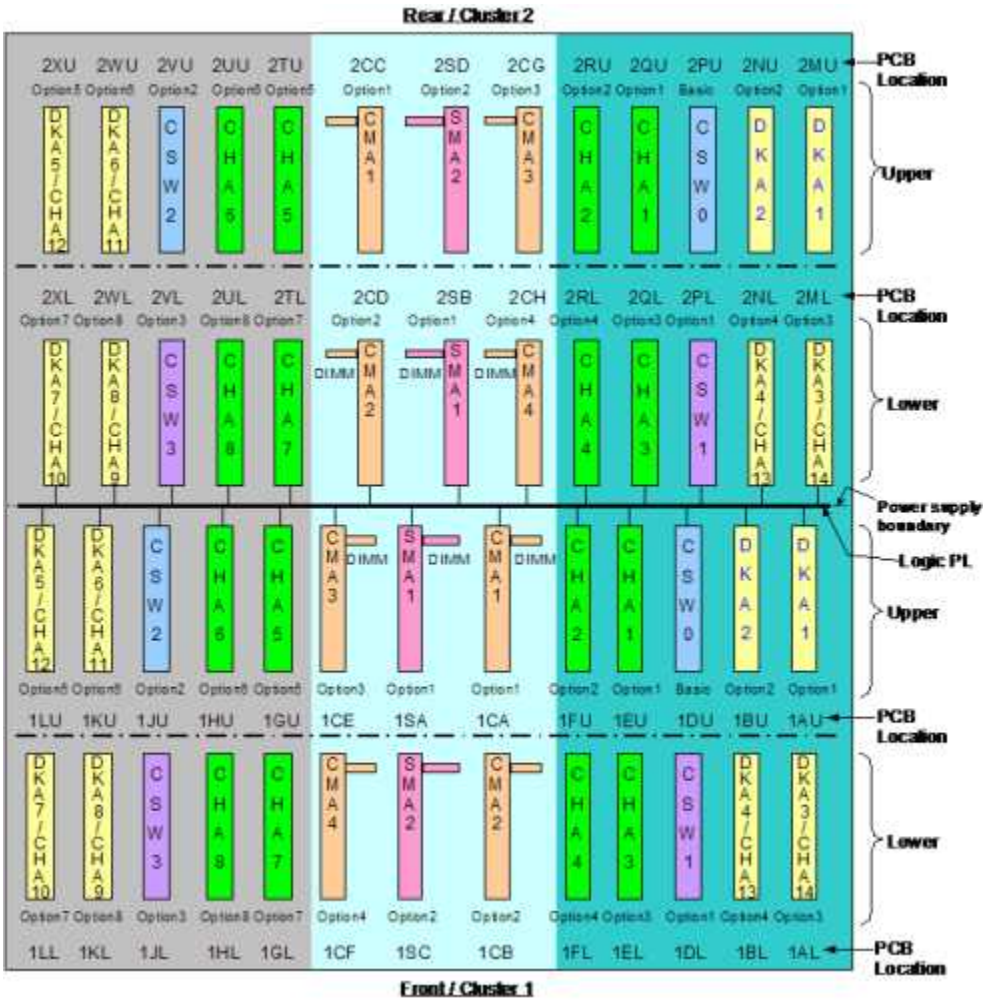


Figure 5 Front and rear PCB clusters in the DKC

Unit emergency power off switch

The UNIT EMERGENCY POWER OFF switch is located on the back of the DKC cabinet. For more information about this switch, see "Emergency power off" on page 39.

Service Processor (SVP)

The Service Processor inside the controller performs these functions:

- Collects performance data on the system for diagnostic testing and analysis
- Provides your HP support representative with maintenance access to the system
- Hosts system management software

Your HP support representative uses the SVP to configure, maintain, and upgrade the system software and hardware. The SVP is not a customer-accessible component.

To protect your security, the SVP does not have access to any user data stored on array disks.

If you have extreme availability requirements, an optional second SVP is available.

Disk array frames

DKUs are optional cabinets that allow you to expand the disk array's storage capacity. DKUs contain physical disk drives. The disk array can include up to four DKUs. Four DKUs fully populated with disk drives (plus the disk drives in the DKC) provide up to 1152 total hard disk drives for the XP24000 and 240 total hard disk drives for the XP20000.

Disk drives

The DKC can hold up to 128 hard disk drives for the XP2400 and 120 hard disk drives for the XP20000. Each DKU can contain up to 256 hard disk drives installed on the XP24000 and 240 hard disk drives installed on the XP20000. There can be from zero to four DKU's. The disk array automatically detects and corrects disk errors, and an HP support representative can replace or add disk drives without disrupting user activity.

The disk array can contain up to 40 spare disk drives for the XP24000 and 16 spare disk drives on the XP20000. Any of the spare disk drives can back up any other disk drive of equal rotational speed and equal or lesser capacity, in any DKU, even if the failed disk and the spare disk are in different array domains.

The XP24000/XP20000 disk arrays support several sizes of Fibre Channel, SATA, and solid state disk drives. Fibre Channel drives are intended as a high-capacity, high-performance storage option for high-priority applications.

As shown in Figure 6, disk drives install in the Hard Drive Unit (HDU) boxes mounted in the DKC and DKU frames. Each box holds four groups of 16 drives for the XP24000 and holds four groups of 15 drives for the XP20000. The drives in the HDU connect to the DKA through a Fibre Switch (FSW) and the FC-AL path. The lower drives in an HDU (FSW-L) connect to the DKA pair in Cluster 1, and the upper drives in an HDU connect to the DKA pair in Cluster 2.

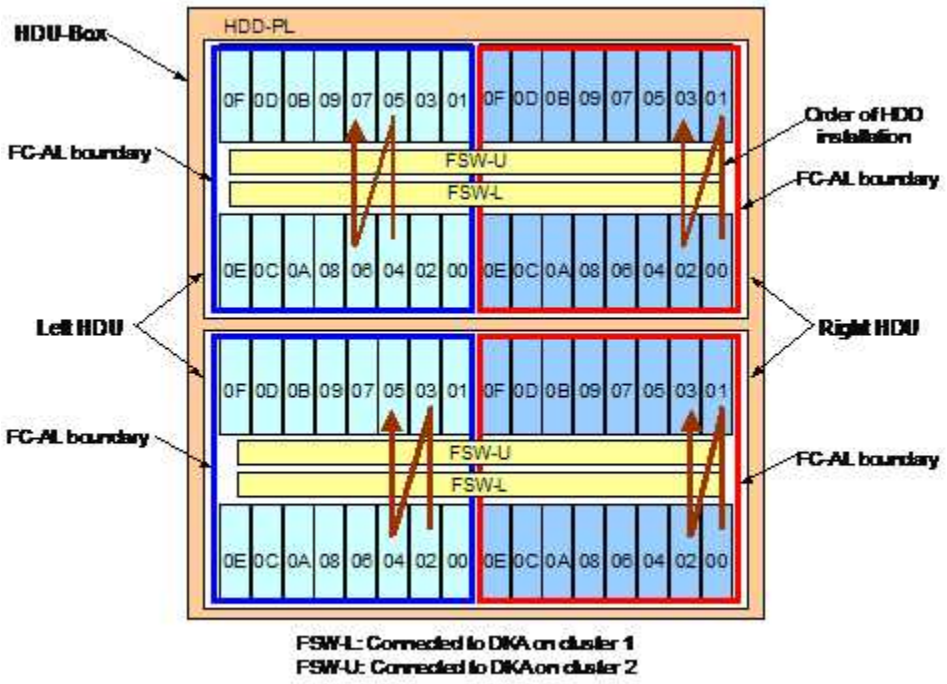


Figure 6 Disk drive installation in the HDU box

Figure 7 shows how the disk adapters connect to the HDUs in a fully expanded system.

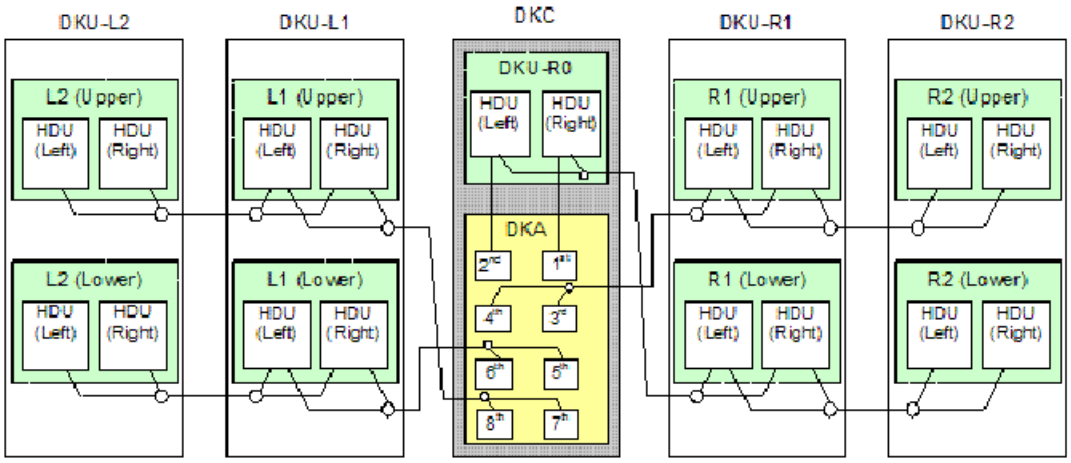


Figure 7 DKA and HDU interconnections

RAID options

The disk array supports RAID1 (2D+2D or 4D+4D), RAID5 (3D+1P or 7D+1P), and RAID6 (6D+2P) array groups. RAID levels may be intermixed, as illustrated by Figure 8.

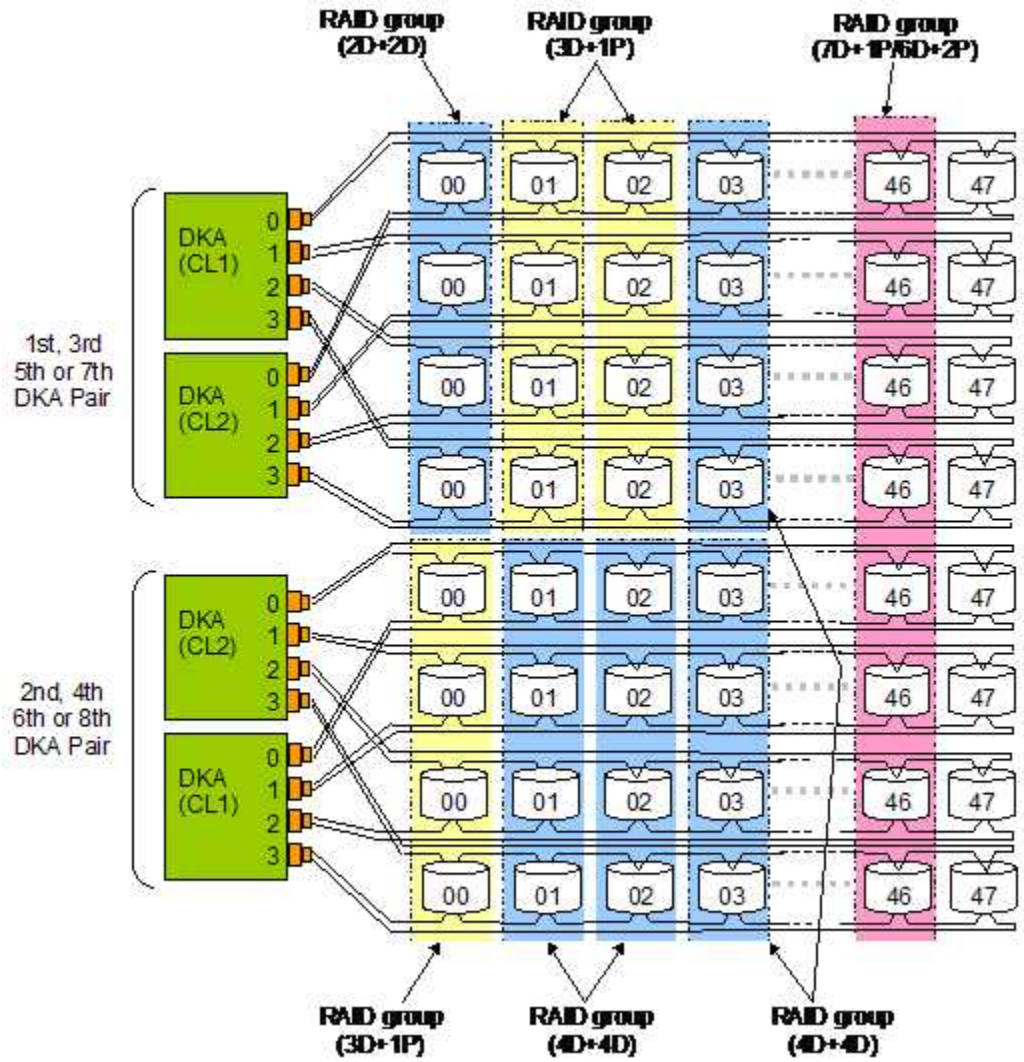


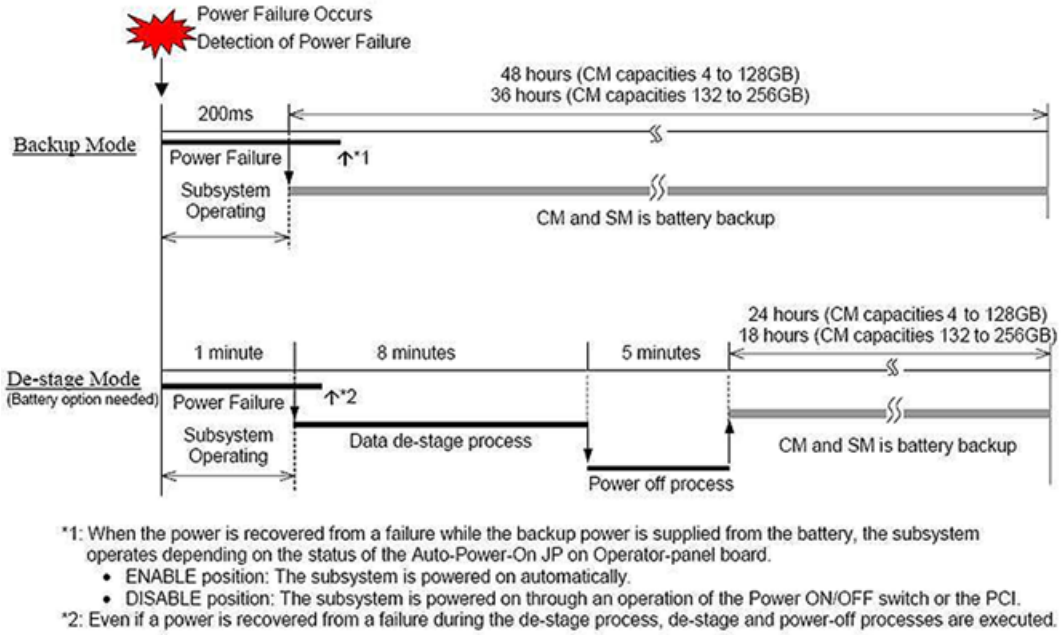
Figure 8 Intermixed RAID groups

Backup batteries

The XP24000/XP20000 disk arrays use batteries and two modes of backup operation to provide backup power protection for cache memory, shared memory, the DKAs, CHAs, and disk drives. If AC input power is lost, the disk array continues normal operation for 200 ms or 1 minute, depending on whether the disk array is set for Backup Mode or De-stage Mode. See Figure 9.

If Backup Mode is selected and AC power is lost for more than 200 ms, the disk array enters the Backup Mode, which maintains the contents of cache and shared memory for 36 to 48 hours, depending on the amount of cache memory installed. This mode is the default and the only available mode for the base battery configuration.

If De-stage Mode is selected and sufficient optional DKC and DKU backup batteries are installed, the batteries maintain normal operation for 1 minute. After 1 minute without AC power, the disk array executes the De-stage Mode, which saves the contents of cache and shared memory to disk, maintains the contents of cache and shared memory for 16 to 24 hours, and powers down the system. Even if power is restored shortly after one minute, the de-stage and power down processes continue until they are completed.



*1: When the power is recovered from a failure while the backup power is supplied from the battery, the subsystem operates depending on the status of the Auto-Power-On JP on Operator-panel board.

- ENABLE position: The subsystem is powered on automatically.
- DISABLE position: The subsystem is powered on through an operation of the Power ON/OFF switch or the PCI.

*2: Even if a power is recovered from a failure during the de-stage process, de-stage and power-off processes are executed.

Figure 9 Battery de-staging and backup modes

When AC power is restored, the disk array powers on again automatically if the AUTO POWER-ON jumper is set to ENABLE. If the jumper is set to DISABLE, the disk array must be manually powered on again using the control panel PS ENABLE and PS ON/OFF switches. Before installation HP representatives will help you determine the best battery mode and power-on mode for your configuration and will configure the selected mode for you.

Operating specifications

This section provides some general specifications. For complete specifications, see the *HP StorageWorks Disk Array Site Preparation Guide* available on the HP storage manuals website:

http://www.hp.com/support/manuals

XP24000/XP20000 hardware specifications

The following tables provide selected hardware specifications for the XP24000/XP20000 Disk Arrays. For additional specifications, see the *HP StorageWorks Disk Array Site Preparation Guide*.

Table 4 XP24000 selected hardware specifications

Feature	Specification
Power	Single-phase, 50 or 60 Hz, or 3-phase
DKC/DKU	One XP24000 DKC, zero to four XP24000 DKUs
Maximum hard disk drives	1152
Maximum spare disk drives	40
Maximum array groups/subsystem	287

Feature	Specification
Maximum storage capacity (not including external storage)	332 TB (where 1 TB = 10^{12} bytes) (Usable storage is always less than the maximum raw storage capacity.)
Cache	4 to 512 GB
Hard disk and flash drives	• 73 GB 15000 RPM FC • 73 GB Solid State • 146 GB 15000 RPM FC • 146 GB Solid State • 200 GB Solid State • 300 GB 10000 RPM FC • 300 GB 15000 RPM FC • 400 GB Solid State • 750 GB 7200 RPM SATA • 400 GB 10000 RPM FC • 1TB 7.2k SATA Array Group • 450GB 15K RPM HDD • 8 Port 8 GB FC CHA • 8 GB LW Transceiver
Shared memory	2 to 32 GB (Available shared memory depends on the configuration)
Disk Adapters (DKAs)	Up to two adapters supporting two DKA pairs (4 DKAs total) per DKU. DKAs are sold in sets of 2 pairs. • 2 DKA pairs = up to 256 HDDs, 16 paths • 4 DKA pairs = up to 640 HDDs, 32 paths • 6 DKA pairs = up to 768 HDDs, 48 paths • 8 DKA pairs = up to 1152 HDDs, 64 paths
Channel Adapters (CHAs)	1 to 14 adapters (each DKA set above 4 reduces the maximum number of CHAs by two) • Fibre Channel: up to 224 ports • ESCON: up to 112 ports • FICON: up to 112 ports
Configuration disk	XP24000-specific
SVP code	XP24000-specific
High-availability secondary SVP	Optionally available
RAID level	• RAID1 (2D+2D) • RAID1 (4D+4D) • RAID5 (3D+1P) • RAID5 (7D+1P) • RAID6 (6D+2P)
LDEVs	Up to 64K

Feature	Specification
LUNs per port	Up to 1024

Table 5 XP20000 selected hardware specifications

Feature	Specification
Power	Single-phase, 50 or 60 Hz
DKC/DKU	One XP20000 DKC, zero to one XP20000 DKU
Maximum hard disk drives	240
Maximum spare disk drives	16
Maximum array groups/subsystem	287
Maximum storage capacity (excluding external storage)	69.2 TB (where 1 TB = 10^{12} bytes) (Usable storage is always less than the maximum raw storage capacity.)
Cache	4 to 128 GB
Available hard disk drives	• 73 GB 15000 RPM FC • 73 GB Solid State • 146 GB 15000 RPM FC • 146 GB Solid State • 200 GB Solid State • 300GB 10000 RPM HDD • 300 GB 10000 RPM or 15,000 RPM FC • 400 GB 10,000 RPM or 15,000 RPM FC • 400 GB Solid State • 750 GB 7200 RPM SATA • 1TB 7.2k SATA Array Group • 450GB 15000 RPM HDD • 600 GB 15K FC HDD • 2TB 7.2K HDD
Shared memory	2 to 16 GB (Available shared memory depends on the configuration)
Disk Adapters (DKAs)	Up to two adapters supporting two DKA pairs (4 DKAs total) per DKU. DKAs are sold in sets of 2 pairs. • 1 DKA pair = up to 240 HDDs
Channel Adapters (CHAs)	1 to 6 adapters (each DKA set above 4 reduces the maximum number of CHAs by two) • Fibre Channel: up to 48 ports • ESCON: up to 24 ports • FICON: up to 24 ports
Configuration disk	XP20000-specific

Feature	Specification
SVP code	XP20000-specific
High-availability secondary SVP	Optionally available
RAID level	• RAID1 (2D+2D) • RAID1 (4D+4D) • RAID5 (3D+1P) • RAID5 (7D+1P) • RAID6 (6D+2P)
LDEVs	Up to 64K
LUNs per port	Up to 1024

Temperature specifications

Table 6 XP24000/XP20000 temperature specifications

Temperature range type	Range
Recommended operating temperature range	21 to 24 degrees C, 70 to 75 degrees F
Operating temperature	16 to 32 degrees C, 61 to 89 degrees F
Nonoperating temperature range	–10 to +43 degrees C, 14 to 109 degrees F
Shipping and storage temperature (product packed in factory packing)	–25 to +60 degrees C, –13 to +140 degrees F
Temperature shock immunity (maximum rate of temperature change)	10 degrees C per hour, 18 degrees F per hour
Over-temperature warning	At 40 degrees C, 104 degrees F
Over-temperature shutdown	At 60 degrees C, 140 degrees F

Humidity specifications

Protect the disk array from excessive humidity. You should not observe condensation in or around the product under any conditions. There is no procedure for recovery from moisture condensation.

Table 7 XP24000/XP20000 humidity specifications

Humidity range type	Noncondensing relative humidity (RH)
Recommended operating humidity range at 22 degrees C (71 degrees F)	50% to 55%
Operating humidity range at 22 degrees C (71 F)	20% to 80%
Nonoperating humidity range	8% to 90%

Humidity range type	Noncondensing relative humidity (RH)
Shipping and storage humidity range (product packed in factory packing)	5% to 95%

Mechanical vibration specifications

Maximum operating acceleration is 0.05G at a frequency range of 10 to 300 Hz.

XP24000/XP20000 AC line voltage requirements

Each DKC or DKU has two or four power cords. In case of a failure of the power source for one cord, the power requirements, and therefore the current requirement for the remaining power cord, will double.

For details about cabling and connectors, current requirements, and other electrical specifications, see the *HP StorageWorks XP24000/XP20000 Disk Array Site Preparation Guide*.

Table 8 XP24000 DKC power specifications for 50-amp, 50 or 60 Hz, single-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of power cords	2	2	2	2	2
Recommended circuit breakers	50A	50A	50A	50A	50A
Number of circuit breakers	2	2	2	2	2

Table 9 XP24000 DKC power specifications for 30-amp, 50 or 60 Hz, single-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of power cords	4	4	4	4	4
Recommended circuit breakers	30A	30A	30A	30A	30A

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of circuit breakers	4	4	4	4	4

Table 10 XP24000 DKC power specifications for 30-amp, 50 or 60 Hz, three-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz	380 VAC 50 Hz	400 VAC 50 Hz	415 VAC 50 Hz
Number of power cords	2	2	2	2	2	2	2	2
Recommended circuit breakers	30A	30A	30A	30A	30A	30A	30A	30A
Number of circuit breakers	2	2	2	2	2	2	2	2

Table 11 XP24000 DKU power specifications for 50-amp, 50 or 60 Hz, single-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of power cords	2	2	2	2	2
Recommended circuit breakers	50A	50A	50A	50A	50A
Number of circuit breakers	2	2	2	2	2

Table 12 XP24000 DKU power specifications for 30-amp, 50 or 60 Hz, single-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of power cords	4	4	4	4	4
Recommended circuit breakers	30A	30A	30A	30A	30A

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of circuit breakers	4	4	4	4	4

Table 13 XP24000 DKU power specifications for 30-amp, 50 or 60 Hz, three-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz	380 VAC 50 Hz	400 VAC 50 Hz	415 VAC 50 Hz
Number of power cords	2	2	2	2	2	2	2	2
Recommended circuit breakers	30A	30A	30A	30A	30A	30A	30A	30A
Number of circuit breakers	2	2	2	2	2	2	2	2

Table 14 XP20000 DKC power specifications for 20-amp, 50 or 60 Hz, single-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of power cords	4	4	4	4	4
Recommended circuit breakers	20A	20A	20A	20A	20A
Number of circuit breakers	4	4	4	4	4

Table 15 XP20000 DKU power specifications for 30-amp, 50 or 60 Hz, single-phase

Parameter	200 VAC 50/60 Hz	208 VAC 60 Hz	220 VAC 50 Hz	230 VAC 50/60 Hz	240 VAC 50 Hz
Number of power cords	4	4	4	4	4
Recommended circuit breakers	30A	30A	30A	30A	30A
Number of circuit breakers	4	4	4	4	4

3 Operating the HP XP24000/XP20000 Disk Array

During normal operations, the disk array does not require your intervention and you should not attempt to open the disk array cabinets.

The disk array reports any service information messages (SIMs) to the SVP and the Device Manager server. If the array is set up for remote support using either the modem or Internet option, the SVP automatically reports SIMs to the HP Storage Technology Center (STC). For more information about SIMs and the remote support capabilities, including the modem-based and Internet-based options, see "HP StorageWorks XP Continuous Track" on page 43, and also "Failure detection and reporting process" on page 45.

General safety guidelines

Carefully read these safety guidelines and follow them when working with the disk array.

- Fully understand and follow all hazard warnings in this guide and on warning labels on the disk array. These hazard warnings help you to prevent or reduce the risk of death, personal injury, or product damage. Hazard warnings include alert headings consisting of an alert symbol and the word *Caution* or *Warning*.

△ CAUTION:

This indicates a hazardous situation which, if not avoided, will or can result in serious product damage or loss of data.

⚠ WARNING!

This indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

- Replace any warning label that becomes dirty or starts peeling off.
- Keep in mind that the hazard warnings in this guide and on the disk array cannot cover every possible hazard because it is impossible to predict and evaluate all potentially hazardous circumstances. Be alert and use common sense. If you have any questions, contact your HP support representative.
- Follow the safety guidelines and procedures in all documentation for this and related products.

△ CAUTION:

Disk array maintenance must be done only by trained and qualified HP support representatives. Only an HP support representative can power off the disk array, except in an emergency.

△ CAUTION:

Do not perform any procedures not described in this guide. If you have any questions or concerns, contact your HP support representative.

⚠ WARNING!

Do not touch areas marked HAZARDOUS, even with the power off. These areas contain high-voltage power.

△ CAUTION:

If you detect any abnormal noise, smell, or smoke coming from the disk array, immediately power off the disk array by following the emergency power off procedure later in this chapter. For routine power off in non-emergency situations, contact your HP support representative.

△ CAUTION:

Do not power off the system unless it is an emergency situation and you follow the procedure for Emergency power off.

△ CAUTION:

Keep the front and rear doors closed at all times.

△ CAUTION:

Keep the tops and sides of the cabinets clear to allow air to flow properly.

△ CAUTION:

Use the supplied power cord. The power cord may not be used with other products.

Managing the disk array

The Remote Web Console software allows browser-based management of a single disk array. You can install the optional HP StorageWorks XP Array Manager software and the HP StorageWorks Command View XP Advanced Edition software on an optional management server to enable additional management capabilities, including the ability to manage multiple arrays. You can also install other HP StorageWorks XP Disk Array software on the management server.

You may use an existing host (such as your storage administrator's PC) as the management server provided that it meets system requirements for the software you plan to deploy. To protect your security, the disk array management software does not have access to user data stored on the disk array. The management server connects to the disk array(s) using an Ethernet LAN connection, as shown in Figure 10.

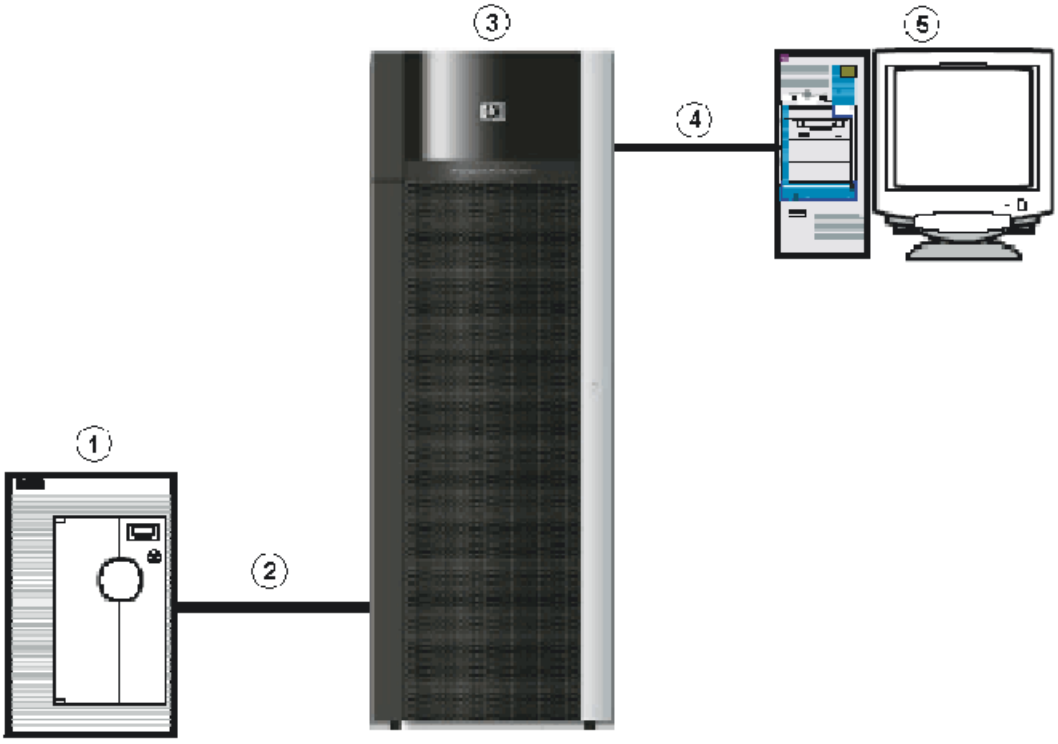


Figure 10 Disk array management connections

1. Host computer
2. Host connection (Fibre Channel or other connection type)
3. DKC
4. Ethernet LAN
5. Management server

Control panel and LED descriptions

Once the disk array is powered on and running normally, no user operations are required at the control panel, except when you are instructed by your HP support representative.

Figure 11 shows the control panel location and layout. Table 16 explains the control panel functions.

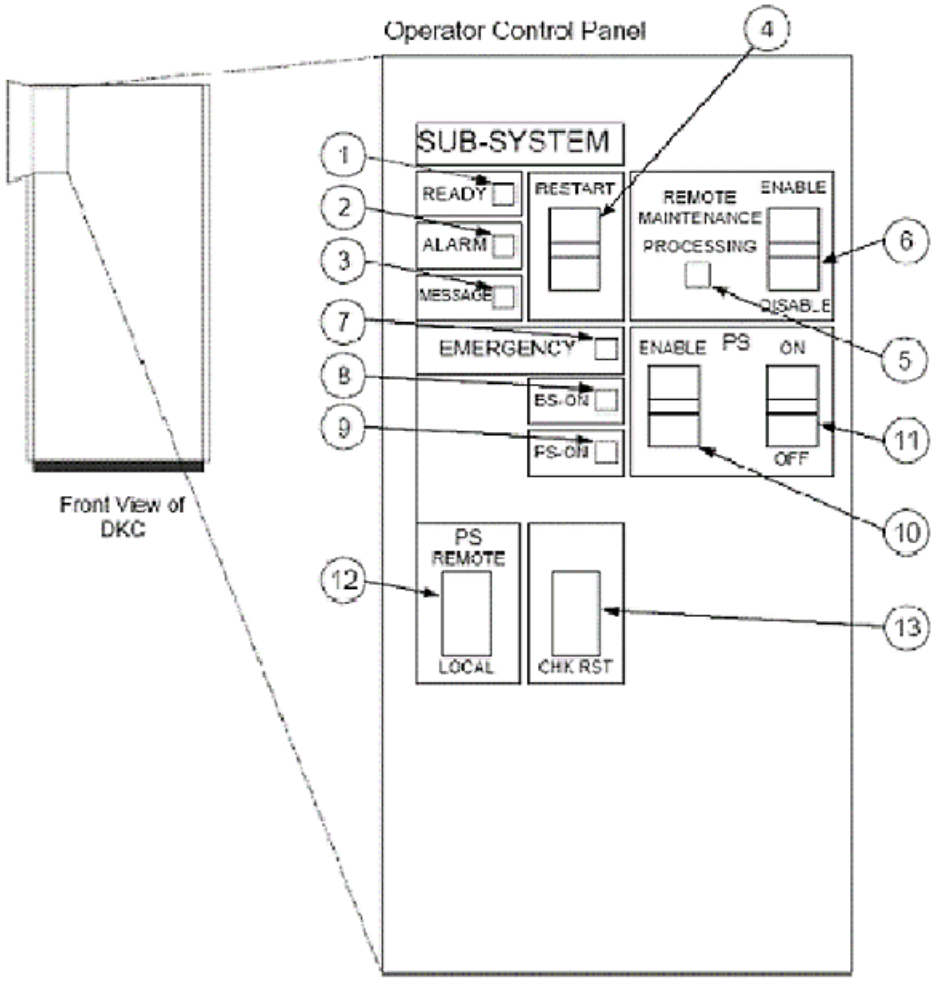


Figure 11 Control panel and LED descriptions

Table 16 Control panel control and LED descriptions

Item	Label	Indicator	Description
1	SUB-SYSTEM READY	LED (Green)	During normal operation, this LED should be on. • **ON:** Input/output operation on the channel interface is enabled. • **OFF:** The system is not accepting data.

Item	Label	Indicator	Description
2	SUB-SYSTEM ALARM	LED (Red)	During normal operation, this LED should be off. • **ON:** One or more of the following: • DKC DC power is under voltage. • DC power is over current. • The temperature is abnormally high. • An unrecoverable failure has occurred. If the disk array is set up for remote support, your HP support representative is notified automatically. If the disk array is not set up for remote support, place a service call to HP to have the message evaluated to determine if any action is required. • **BLINKING:** DKU DC power is under voltage.
3	SUB-SYSTEM MESSAGE	LED (Amber)	During normal operation, this LED should be off. • **ON:** A service information message (SIM) has been issued from either storage cluster. If the disk array is set up for remote support, your HP support representative is notified automatically. If the disk array is not set up for remote support, place a service call to HP to have the message evaluated to determine if any action is required. • **BLINKING:** An SVP failure has occurred. The disk array will continue to operate normally. Place a service call to HP to ensure notification. SVP failures may not be reported automatically to STC.
4	SUB-SYSTEM RE-START	Switch	Used to recover from a FICON/ESCON port failure. Do not change the switch position unless directed to do so by HP service personnel.
5	REMOTE MAINTENANCE PROCESSING	LED (Amber)	During normal operation, this LED may be on if remote maintenance is allowed (the REMOTE MAINTENANCE ENABLE/DISABLE switch is in the ENABLE position). • **ON:** Remote maintenance is in progress. An HP support representative is probably working on the system, but the system is online and accepting data.
6	REMOTE MAINTENANCE ENABLE/DISABLE	Switch	Used to permit remote service maintenance. During normal operation, this switch should be in the ENABLE position. • **DISABLE:** Remote maintenance is disabled. • **ENABLE:** An HP support representative can perform remote maintenance. Do not change the switch position unless directed to do so by HP service personnel.
7	EMERGENCY	LED (Red)	During normal operation, this LED should be on. • **ON:** The UNIT EMERGENCY POWER OFF switch on the back of the disk array cabinet is in the ON position. • **OFF:** The UNIT EMERGENCY POWER OFF switch is in the OFF position. Place a service call to HP to have an HP support representative reset the switch.

Item	Label	Indicator	Description
8	BS-ON	LED (Amber)	During normal operation, this LED should be on. • **ON:** The disk array is plugged in and receiving power from the primary AC outlet. The SVP is receiving power from the outlet. • **OFF:** The disk array is not receiving power from the primary AC outlet. Check the electrical outlets in your building.
9	PS-ON	LED (Green)	During normal operation, this LED should be on. • **ON:** The PS ON/OFF switch is on. If the SUB-SYSTEM READY light (1) is also on, the disk array is ready to receive data. • **OFF:** The PS ON/OFF switch is off and the disk array is not ready to receive data.
10	PS ENABLE	Switch	Used to enable the PS ON/OFF switch (11). During normal operation, this switch should be in the "Disable" position (opposite the ENABLE position). • **ENABLE:** The PS ON/OFF switch can be used. • **DISABLE:** The PS ON/OFF switch cannot be used. Do not change the switch position unless directed to do so by HP service personnel.
11	PS ON/OFF	Switch	Used to power on/off the disk array. During normal operation, this switch should be in the ON position. **The switch functions only if:** the PS ENABLE switch (10) is in the ENABLE position, **AND** the PS REMOTE/LOCAL switch (12) is in the LOCAL position. Do not change the switch position unless directed to do so by HP service personnel.
12	PS REMOTE/LOCAL	Switch	Determines how the disk array is powered on or off. During normal operation, this switch may be in either position, depending on your operating environment. • **REMOTE:** Disk array is powered on/off by the instructions of the host PCI (*mainframe only*). • **LOCAL:** Disk array is powered on/off by the PS ON/OFF switch (11). Do not change the switch position unless directed to do so by HP service personnel.
13	CHK RST	Switch	Used by an HP support representative to test the functioning of the LEDs on the control panel or to reset alarms. Do not change the switch position unless directed to do so by HP service personnel.

Powering down the disk array

Two situations may arise when you need to power down the system:

- Planned power off
- Emergency power off

Planned power off

Occasionally, you may need to plan a site power outage, such as during alterations to the data center, inspections, or work by the electric company. If a scheduled power outage will affect the disk array, contact your HP support representative to schedule a planned power off.

△ CAUTION:

Only a trained HP support representative can shut down and power off the disk array.
Do not attempt to power down the disk array other than during an emergency.

Emergency power off

In an emergency, it is critical to remove power to the disk array as quickly as possible.

△ CAUTION:

Performing the emergency power off procedure immediately shuts down the disk array, neglecting the array's normal power off sequence. Jobs in process are aborted and their integrity after recovery is not guaranteed. Use this power off method **only** in an emergency. Only a qualified HP support representative can reset the switch and restore power to the disk array.

Emergency situations in which you should consider performing the emergency power off procedure are:

- A physical location catastrophe such as a flood, hurricane, tornado, or earthquake
- Any circumstance that presents the threat of injury or death to a person
- You detect any smoke, abnormal loud noise, or smell coming from the disk array

To power off the disk array in an emergency

1. Locate the UNIT EMERGENCY POWER OFF switch on the back side of the DKC, as shown in Figure 12.

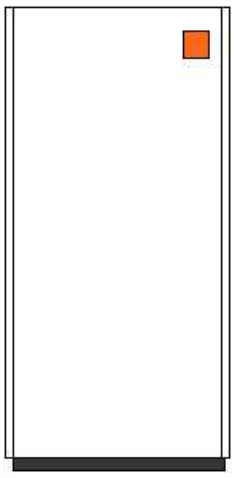


Figure 12 Emergency power-off switch location

2. Pull the switch up and then out towards you.

   The disk array shuts down immediately. The UNIT EMERGENCY POWER OFF switch mechanically locks itself in the off position to prevent anyone from restoring power in a potentially hazardous situation.

⚠ WARNING!

The UNIT EMERGENCY POWER OFF switch provides only partial power off capability. AC input power remains present at the primary circuit.

3. When the emergency situation is over, call the HP technical support center. Only a qualified HP support representative can reset the switch and restore power to the disk array.

Recovering from an unplanned power outage

Unplanned power outages occur when the primary building power is lost due to electrical blackouts, thunderstorm activity, or similar occurrences, and input AC power is not received by the disk array. The disk array will maintain its state and recover when power is restored.

The disk array cache is powered by backup batteries that will maintain the array state for up to 48 hours, depending on the selected battery operation mode. For more information, see "Backup batteries" on page 25.

Manual restart after power is restored

△ CAUTION:

After power is restored to your site and before restoring power to the disk array, HP recommends that you have an electrician verify the power to ensure that all phases are restored and input power to the disk is stable.

Contact your HP representative for help recovering from a power outage.

To restart the disk array manually

1. Move the PS ENABLE switch to the ENABLE position.

2. Move the PS ON/OFF switch to the ON position.

   The following LED power sequence occurs:

   - BS-ON turns amber.
   - PS-ON turns green.
   - SUB-SYSTEM MESSAGE may turn amber if the disk array is not configured for remote support. This indicates the system has produced a service information message because of the power outage.
   - SUB-SYSTEM READY turns green, signifying the system is ready.

△ CAUTION:

Powering on the disk array can take up to 10 minutes and is complete only when the SUB-SYSTEM READY LED turns green.

3. Move the PS ENABLE switch to "DISABLE" (opposite ENABLE).

Automatic restart when power is restored

△ CAUTION:

As with all sophisticated electronic equipment, unstable power conditions during a restart can cause problems. HP recommends automatic power on restart **only** if the power to the disk array is subject to power conditioning equipment, such as an uninterruptible power supply (UPS), to ensure that the power restored to the disk array is stable.

If your site does not have a UPS, HP recommends that the disk array be configured for manual restart, meaning the POWER ENABLE switch on the control panel is in the DISABLE position. After a power outage, follow the manual restart procedure only after power has been restored and verified stable.

With automatic restart enabled, the disk array automatically restarts and returns to service when power is restored.

During the automatic restart, the following LED power sequence occurs:

- BS-ON turns amber.
- PS-ON turns green.
- SUB-SYSTEM MESSAGE may turn amber if the disk array is not configured for remote support. This indicates the system has produced a service information message because of the power outage.
- SUB-SYSTEM READY turns green, signifying the system is ready.

△ CAUTION:

Powering on the disk array can take up to 10 minutes and is complete only when the SUB-SYSTEM READY LED turns green.

To enable automatic restart:

- Move the AUTO PS-ON ENABLE/DISABLE switch to the ENABLE position.

4 Troubleshooting the HP XP24000/XP20000 Disk Array

Service information messages

The system generates service information messages (SIMs) to identify normal operations, service requirements, and failures. SIMs are generated by the SVP and the system microprocessors. Your HP support representative uses the SIMs to monitor and troubleshoot the system as explained below. You can view SIMs using the system's management software.

HP StorageWorks XP Continuous Track (C-Track)

The HP StorageWorks XP Continuous Track (C-Track) remote support solution detects and reports system problems to the HP Storage Technology Centers (STCs). C-Track transmits heartbeats, system information messages (SIMs), and configuration information for remote data collection and monitoring purposes. C-Track also enables the STCs to remotely diagnose issues and perform maintenance, if you permit remote device access (RDA).

The C-Track solution offers an Internet connectivity option for the XP24000/XP20000 disk arrays in addition to a modem connectivity option.

The C-Track solution offers an Internet connectivity option for the XP24000/XP20000 disk arrays in addition to a modem connectivity option. If you choose the Internet-based remote support solution, additional infrastructure and site preparation are required. This additional preparation may include server and router requirements, and HP and the customer may both have implementation responsibilities.

For more information about the C-Track Internet-based solution, ask your HP representative.

If you use the modem connectivity option, you can disable C-Track remote diagnosis and maintenance by setting the Remote Maintenance Enable/Disable switch to the Disable position. When the switch is in this position, HP technical support cannot perform remote disk array maintenance. However, the C-Track remote data collection and monitoring functions remain enabled.

If you use the Internet connectivity option, you can disable remote diagnosis and maintenance by configuring the Customer Access System (CAS) component of the solution to prevent external login by HP support personnel. The Remote Maintenance Enable/Disable switch position is irrelevant for the Internet connectivity option, and the C-Track remote data collection and monitoring functions remain enabled even though remote diagnosis and maintenance are disabled.

By implementing certain configuration settings, HP can disable remote data collection and monitoring, or remote diagnosis and maintenance, or both.

HP Insight Remote Support Advanced

HP strongly recommends that you install HP Insight Remote Support software to complete the installation or upgrade of your product and to enable enhanced delivery of your HP Warranty, HP Care Pack Service or HP contractual support agreement. HP Insight Remote Support supplements your monitoring,

24x7 to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product's service level. Notifications may be sent to your authorized HP Channel Partner for on-site service, if configured and available in your country. The HP Insight Remote Support products available for the XP24000/XP20000 disk arrays are described in Table 17 on page 44.

NOTE:

HP Insight Remote Support Standard is not supported on XP Disk Arrays.

Table 17 HP XP24000/XP20000 Disk Array Remote Support Products

HP Product	Description	Application
AE241A	HP XP Remote Device Access w/LAN Support (Recommended)	For customers that fully commit to use HP Remote Support. It uses HP Insight Remote Support for XP Remote Device Monitoring utilizing LAN/Internet connectivity and Remote Device Access Support. This configuration is required to meet the objectives of XP disk array's Internet connectivity with Remote Device Access initiative and prerequisites for Critical Support contracts. HP recommends that the AE241A product with Internet connectivity should be utilized for all new XP installations, to ensure the optimal support model and highest TCE.
AE242A	HP XP No Remote Device Access w/LAN Supp (Default)	For customers that commit to utilize Internet and Insight Remote Support connectivity for XP Remote Device Monitoring but will not allow for Remote Device Access to the XP array from HP for proactive and critical support processes. With no Remote Device Access, Critical Support contract prerequisites cannot be met.
AE243A	HP XP Modem Remote Support	For customers that will commit to utilize remote support connectivity via modem rather than LAN/Internet connectivity. Modem is older technology that is significantly less reliable than LAN/Internet connectivity, is less capable, does not support some features for Remote Device Access, and generally should not be considered for new installations. The AE243A product is only allowed for customers that have valid reasons for not using Internet connectivity. The initial cost of this configuration only covers the additional warranty support cost to HP during warranty period. Other additional costs can also be incurred for support contracts for customers who do not have LAN configured. Factory Authorization will be required to order this product. Proof of a valid reason that Internet connectivity is not allowed must be provided for Factory Authorization approval.
AE244A	HP XP Mission Critical No LAN Support	For a customer whose strict security protocols specifically prohibit inbound/outbound traffic to/from the data center and thus will not allow Remote Support connection by either modem or LAN/internet connectivity; but does have Mission Critical Services with Customer Engineer onsite included in the terms of the support contract. Factory Authorization will be required to order this product. Proof of valid Customer Engineer onsite Mission Critical support contract must be provided for Factory Authorization approval.

HP Product	Description	Application
AE245A	HP XP No Mission Critical No LAN Support	For a customer whose strict security protocols specifically prohibit inbound/outbound traffic to/from the data center and thus will not allow Remote Support connection by either modem or LAN and does not have a Mission Critical Services on-site contract. The added cost of this configuration only covers the additional warranty support cost to HP during warranty period. Other additional costs can also be incurred for support contracts for customers who do not have remote support configured.

Details for both versions are available at:

http://www.hp.com/go/insightremotesupport

To download the software, go to Software Depot:

http://www.software.hp.com

Select **Insight Remote Support** from the menu on the right.

Failure detection and reporting process

If a failure occurs in the system, the failure is detected and reported to the system log, the SIM log, and HP technical support, as shown in Figure 13.

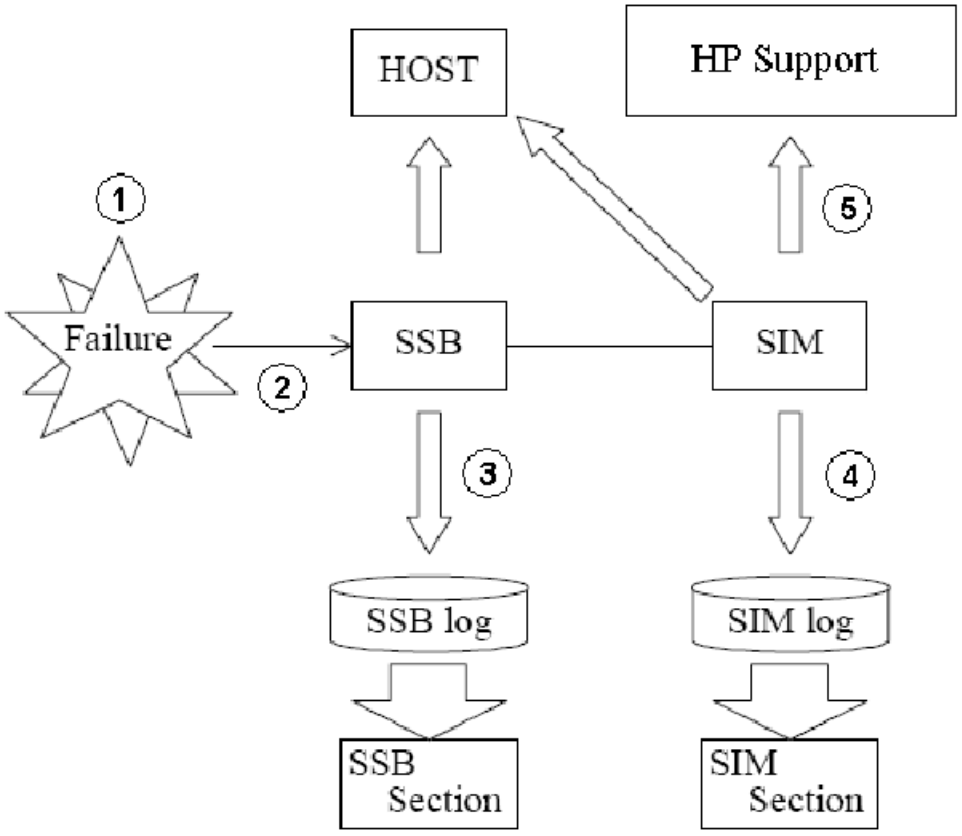


Figure 13 Failure reporting process

1. A failure is detected in the system.

2. The failure is reported to the system.

3. The system stores the failure information in the system log.

4. The generated SIMs are stored on the system for use by HP technical support representatives, and logged on the management server as remote SIMs (R-SIMs). If the system is not set up for remote support, when a SIM is generated, the amber message LED on the system control panel turns on. Call HP to determine the reason for the message.

5. If the system is set up for remote support, C-Track reports the SIMs to HP technical support through a dedicated dialup or secure Internet connection. SIMs are classified according to severity: service, moderate, serious, or acute. Service and moderate levels do not require immediate attention and are addressed during routine maintenance. These failures are often corrected before the failure becomes apparent. Serious and acute levels are reported immediately to HP support to ensure that the problem is addressed as soon as possible.

5 Support and other resources

Related documentation

The following documents provide related information:

- *HP StorageWorks XP24000/XP20000 Disk Array Site Preparation Guide*
- *HP StorageWorks XP24000/XP20000 Remote Web Console User Guide*
- *HP StorageWorks XP Disk Array Mainframe Host Attachment and Operations Guide*

You can find these documents on the HP Manuals website:

http://www.hp.com/support/manuals

In the Storage section, click **Disk Storage Systems** and then select a product.

HP technical support

For worldwide technical support information, see the HP support website:

http://www.hp.com/support

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

Customer self repair

HP customer self repair (CSR) programs allow you to repair your StorageWorks product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider. For North America, see the CSR website:

http://www.hp.com/go/selfrepair

This product has no customer replaceable components.

Rack stability

Rack stability protects personnel and equipment.

⚠ WARNING!

To reduce the risk of personal injury or damage to equipment:

- Extend leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- In multiple-rack installations, fasten racks together securely.
- Extend only one rack component at a time. Racks can become unstable if more than one component is extended.

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

http://www.hp.com/go/e-updates

After registering, you will receive email notification of product enhancements, new driver versions, firmware updates, and other product resources.

HP websites

For additional information, see the following HP websites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/support/manuals
- http://www.hp.com/storage/spock

Documentation feedback

HP welcomes your feedback.

To make comments and suggestions about product documentation, please send a message to storagedocsFeedback@hp.com. All submissions become the property of HP.

6 Regulatory statements for the HP XP24000/XP20000 Disk Array

FCC EMC statement (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

Hewlett-Packard's device certification tests were conducted with HP computer systems and HP shielded cables, such as those you received with your product. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment. Cables used with this device must be properly shielded to comply with the requirements of the FCC.

Notice for the European Union

This product complies with the following EU directives:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:

CE

This marking is valid for non-Telecom products and EU harmonized products (e.g., Bluetooth).

Certificates can be obtained from http://www.hp.com/go/certificates.

Hewlett-Packard GMbH, HQ-TRE, Herrenberger Strasse 140, 71034 Boeblingen, Germany

IEC statement (worldwide)

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

EMC statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Spécification ATI Classe A (France)

DECLARATION D'INSTALLATION ET DE MISE EN EXPLOITATION d'un matériel de traitement de l'information (ATI), classé A en fonction des niveaux de perturbations radioélectriques émis, définis dans la norme européenne EN 55022 concernant la Compatibilité Electromagnétique.

VCCI EMC statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI EMC statement (Taiwan)

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策的對策

RRL EMC statement (Korea)

사용자 안내문 : A 급 기기

이 기기는 업무용으로 전자파적합등록을 받은 기기이오니, 판매자 또는 사용자는 이 점을 주의 하시기 바라며, 만약 잘못 구입 하셨을 때에는 구입한 곳에서 비업무용으로 교환 하시기 바랍니다.

Harmonics conformance (Japan)

German noise declaration

XP24000/XP20000: Schalldruckpegel Lp = 70 dB(A)

Am Arbeitsplatz (operator position)

Normaler Betrieb (normal operation)

Nach ISO 7779:1988 / EN 27779:1991 (Typprüfung)

Laser safety

When equipped with native Fibre Channel adapters, this product contains a laser internal to the Optical Link Module (OLM) contained on the Channel Adapter boards for connection to a fibre communications network.

In the USA, the OLM is certified as a Class 1 laser product conforming to the PRT requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR, Subchapter J. The certification is indicated by a label on the plastic OLM housing. Outside the USA, the OLM is certified as a Class 1 laser product conforming to the requirements contained in IEC 825-1:1993 and EN 60825-1:1994, including Amendment 11:1996.

The following figure shows the Class 1 information label that appears on the plastic housing of the OLM.

CLASS 1 LASER PRODUCT

Complies with

21 CFR 1040.10 and 1040.11

Each communications port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains an internal semiconductor laser diode in the wavelength range of 770 to 850 nanometers. In the event of a break anywhere in the fibre path, the OLM control system prevents laser emissions from exceeding Class 1 levels. Class 1 laser products are not considered hazardous.

⚠ WARNING!

There are no user maintenance operations, service operations, or adjustments to be performed on the Optical Link Module.

Japan DENAN law cordset caution

Please use the supplied power cord. The power cord may not be used with other products.

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

European WEEE statements

Czech

Likvidace zařízení soukromými domácími uživateli v Evropské unii

Tento symbol na produktu nebo balení označuje výrobek, který nesmí být vyhozen spolu s ostatním domácím odpadem. Povinností uživatele je předat takto označený odpad na předem určené sběrné místo pro recyklaci elektrických a elektronických zařízení. Okamžité třídění a recyklace odpadu pomůže uchovat přírodní prostředí a zajistí takový způsob recyklace, který ochrání zdraví a životní prostředí člověka. Další informace o možnostech odevzdání odpadu k recyklaci získáte na příslušném obecním nebo městském úřadě, od firmy zabývající se sběrem a svozem odpadu nebo v obchodě, kde jste produkt zakoupili.

Danish

Bortskaffelse af affald fra husstande i den Europæiske Union

Hvis produktet eller dets emballage er forsynet med dette symbol, angiver det, at produktet ikke må bortskaffes med andet almindeligt husholdningsaffald. I stedet er det dit ansvar at bortskaffe kasseret udstyr ved at aflevere det på den kommunale genbrugsstation, der forestår genvinding af kasseret elektrisk og elektronisk udstyr. Den centrale modtagelse og genvinding af kasseret udstyr i forbindelse med bortskaffelsen bidrager til bevarelse af naturlige ressourcer og sikrer, at udstyret genvindes på en måde, der beskytter både mennesker og miljø. Yderligere oplysninger om, hvor du kan aflevere kasseret udstyr til genvinding, kan du få hos kommunen, den lokale genbrugsstation eller i den butik, hvor du købte produktet.

Dutch

Verwijdering van afgedankte apparatuur door privé-gebruikers in de Europese Unie

Dit symbool op het product of de verpakking geeft aan dat dit product niet mag worden gedeponeerd bij het normale huishoudelijke afval. U bent zelf verantwoordelijk voor het inleveren van uw afgedankte apparatuur bij een inzamelingspunt voor het recyclen van oude elektrische en elektronische apparatuur. Door uw oude apparatuur apart aan te bieden en te recyclen, kunnen natuurlijke bronnen worden behouden en kan het materiaal worden hergebruikt op een manier waarmee de volksgezondheid en het milieu worden beschermd. Neem contact op met uw gemeente, het afvalinzamelingsbedrijf of de winkel waar u het product hebt gekocht voor meer informatie over inzamelingspunten waar u oude apparatuur kunt aanbieden voor recycling.

English

Disposal of Waste Equipment by Users in Private Household in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Estonian

Seadmete jäätmete kõrvaldamine eramajapidamistes Euroopa Liidus

See tootel või selle pakendil olev sümbol näitab, et kõnealust toodet ei tohi koos teiste majapidamisjäätmetega kõrvaldada. Teie kohus on oma seadmete jäätmed kõrvaldada, viies need elektri- ja elektroonikaseadmete jäätmete ringlussevõtmiseks selleks ettenähtud kogumispunkti. Seadmete jäätmete eraldi kogumine ja ringlussevõtmine kõrvaldamise ajal aitab kaitsta loodusvarasid ning tagada, et ringlussevõtmine toimub viisil, mis kaitseb inimeste tervist ning keskkonda. Lisateabe saamiseks selle kohta, kuhu oma seadmete jäätmed ringlussevõtmiseks viia, võtke palun ühendust oma kohaliku linnakantselei, majapidamisjäätmete kõrvaldamise teenistuse või kauplusega, kust Te toote ostsite.

Finnish

Laitteiden hävittäminen kotitalouksissa Euroopan unionin alueella

Jos tuotteessa tai sen pakkauksessa on tämä merkki, tuotetta ei saa hävittää kotitalousjätteiden mukana. Tällöin hävitettävä laite on toimitettava sähkölaitteiden ja elektronisten laitteiden kierrätyspisteeseen. Hävitettävien laitteiden erillinen käsittely ja kierrätys auttavat säästämään luonnonvaroja ja varmistamaan, että laite kierrätetään tavalla, joka estää terveyshaitat ja suojelee luontoa. Lisätietoja paikoista, joihin hävitettävät laitteet voi toimittaa kierrätettäväksi, saa ottamalla yhteyttä jätehuoltoon tai liikkeeseen, josta tuote on ostettu.

French

Élimination des appareils mis au rebut par les ménages dans l'Union européenne

Le symbole apposé sur ce produit ou sur son emballage indique que ce produit ne doit pas être jeté avec les déchets ménagers ordinaires. Il est de votre responsabilité de mettre au rebut vos appareils en les déposant dans les centres de collecte publique désignés pour le recyclage des équipements électriques et électroniques. La collecte et le recyclage de vos appareils mis au rebut indépendamment du reste des déchets contribue à la préservation des ressources naturelles et garantit que ces appareils seront recyclés dans le respect de la santé humaine et de l'environnement. Pour obtenir plus d'informations sur les centres de collecte et de recyclage des appareils mis au rebut, veuillez contacter les autorités locales de votre région, l es services de collecte des ordures ménagères ou le magasin dans lequel vous avez acheté ce produit.

German

Entsorgung von Altgeräten aus privaten Haushalten in der EU

Das Symbol auf dem Produkt oder seiner Verpackung weist darauf hin, dass das Produkt nicht über den normalen Hausmüll entsorgt werden darf. Benutzer sind verpflichtet, die Altgeräte an einer Rücknahmestelle für Elektro- und Elektronik-Altgeräte abzugeben. Die getrennte Sammlung und ordnungsgemäße Entsorgung Ihrer Altgeräte trägt zur Erhaltung der natürlichen Ressourcen bei und garantiert eine Wiederverwertung, die die Gesundheit des Menschen und die Umwelt schützt. Informationen dazu, wo Sie Rücknahmestellen für Ihre Altgeräte finden, erhalten Sie bei Ihrer Stadtverwaltung, den örtlichen Müllentsorgungsbetrieben oder im Geschäft, in dem Sie das Gerät erworben haben.

Greek

Απόρριψη άχρηστου εξοπλισμού από χρήστες σε ιδιωτικά νοικοκυριά στην Ευρωπαϊκή Ένωση

Το σύμβολο αυτό στο προϊόν ή τη συσκευασία του υποδεικνύει ότι το συγκεκριμένο προϊόν δεν πρέπει να διατίθεται μαζί με τα άλλα οικιακά σας απορρίμματα. Αντίθετα, είναι δική σας ευθύνη να απορρίψετε τον άχρηστο εξοπλισμό σας παραδίδοντάς τον σε καθορισμένο σημείο συλλογής για την ανακύκλωση άχρηστου ηλεκτρικού και ηλεκτρονικού εξοπλισμού. Η ξεχωριστή συλλογή και ανακύκλωση του άχρηστου εξοπλισμού σας κατά την απόρριψη θα συμβάλει στη διατήρηση των φυσικών πόρων και θα διασφαλίσει ότι η ανακύκλωση γίνεται με τρόπο που προστατεύει την ανθρώπινη υγεία και το περιβάλλον. Για περισσότερες πληροφορίες σχετικά με το πού μπορείτε να παραδώσετε τον άχρηστο εξοπλισμό σας για ανακύκλωση, επικοινωνήστε με το αρμόδιο τοπικό γραφείο, την τοπική υπηρεσία διάθεσης οικιακών απορριμμάτων ή το κατάστημα όπου αγοράσατε το προϊόν.

Hungarian

Készülékek magánháztartásban történő selejtezése az Európai Unió területén

A készüléken, illetve a készülék csomagolásán látható azonos szimbólum annak jelzésére szolgál, hogy a készülék a selejtezés során az egyéb háztartási hulladéktól eltérő módon kezelendő. A vásárló a hulladékká vált készüléket köteles a kijelölt gyűjtőhelyre szállítani az elektromos és elektronikai készülékek újrahasznosítása céljából. A hulladékká vált készülékek selejtezéskori begyűjtése és újrahasznosítása hozzájárul a természeti erőforrások megőrzéséhez, valamint biztosítja a selejtezett termékek környezetre és emberi egészségre nézve biztonságos feldolgozását. A begyűjtés pontos helyéről bővebb tájékoztatást a lakhelye szerint illetékes önkormányzattól, az illetékes szemeteltakarító vállalattól, illetve a terméket elárusító helyen kaphat.

Italian

Smaltimento delle apparecchiature da parte di privati nel territorio dell'Unione Europea

Questo simbolo presente sul prodotto o sulla sua confezione indica che il prodotto non può essere smaltito insieme ai rifiuti domestici. È responsabilità dell'utente smaltire le apparecchiature consegnandole presso un punto di raccolta designato al riciclo e allo smaltimento di apparecchiature elettriche ed elettroniche. La raccolta differenziata e il corretto riciclo delle apparecchiature da smaltire permette di proteggere la salute degli individui e l'ecosistema. Per ulteriori informazioni relative ai punti di raccolta delle apparecchiature, contattare l'ente locale per lo smaltimento dei rifiuti, oppure il negozio presso il quale è stato acquistato il prodotto.

Latvian

Nolietotu iekārtu iznīcināšanas noteikumi lietotājiem Eiropas Savienības privātajās mājsaimniecībās

Šāds simbols uz izstrādājuma vai uz tā iesaiņojuma norāda, ka šo izstrādājumu nedrīkst izmest kopā ar citiem sadzīves atkritumiem. Jūs atbildat par to, lai nolietotās iekārtas tiktu nodotas speciāli iekārtotos punktos, kas paredzēti izmantoto elektrisko un elektronisko iekārtu savākšanai otrreizējai pārstrādei. Atsevišķa nolietoto iekārtu savākšana un otrreizējā pārstrāde palīdzēs saglabāt dabas resursus un garantēs, ka šīs iekārtas tiks otrreizēji pārstrādātas tādā veidā, lai pasargātu vidi un cilvēku veselību. Lai uzzinātu, kur nolietotās iekārtas var izmest otrreizējai pārstrādei, jāvēršas savas dzīves vietas pašvaldībā, sadzīves atkritumu savākšanas dienestā vai veikalā, kurā izstrādājums tika nopirkts.

Lithuanian

Vartotojų iš privačių namų ūkių įrangos atliekų šalinimas Europos Sąjungoje

Šis simbolis ant gaminio arba jo pakuotės rodo, kad šio gaminio šalinti kartu su kitomis namų ūkio atliekomis negalima. Šalintinas įrangos atliekas privalote pristatyti į specialią surinkimo vietą elektros ir elektroninės įrangos atliekoms perdirbti. Atskirai surenkamos ir perdirbamos šalintinos įrangos atliekos padės saugoti gamtinius išteklius ir užtikrinti, kad jos bus perdirbtos tokiu būdu, kuris nekenkia žmonių sveikatai ir aplinkai. Jeigu norite sužinoti daugiau apie tai, kur galima pristatyti perdirbtinas įrangos atliekas, kreipkitės į savo seniūniją, namų ūkio atliekų šalinimo tarnybą arba parduotuvę, kurioje įsigijote gaminį.

Polish

Pozbywanie się zużytego sprzętu przez użytkowników w prywatnych gospodarstwach domowych w Unii Europejskiej

Ten symbol na produkcie lub jego opakowaniu oznacza, że produktu nie wolno wyrzucać do zwykłych pojemników na śmieci. Obowiązkiem użytkownika jest przekazanie zużytego sprzętu do wyznaczonego punktu zbiórki w celu recyklingu odpadów powstałych ze sprzętu elektrycznego i elektronicznego. Osobna zbiórka oraz recykling zużytego sprzętu pomogą w ochronie zasobów naturalnych i zapewnią ponowne wprowadzenie go do obiegu w sposób chroniący zdrowie człowieka i środowisko. Aby uzyskać więcej informacji o tym, gdzie można przekazać zużyty sprzęt do recyklingu, należy się skontaktować z urzędem miasta, zakładem gospodarki odpadami lub sklepem, w którym zakupiono produkt.

Portuguese

Descarte de Lixo Elétrico na Comunidade Européia

Este símbolo encontrado no produto ou na embalagem indica que o produto não deve ser descartado no lixo doméstico comum. É responsabilidade do cliente descartar o material usado (lixo elétrico), encaminhando-o para um ponto de coleta para reciclagem. A coleta e a reciclagem seletivas desse tipo de lixo ajudarão a conservar as reservas naturais; sendo assim, a reciclagem será feita de uma forma segura, protegendo o ambiente e a saúde das pessoas. Para obter mais informações sobre locais que reciclam esse tipo de material, entre em contato com o escritório da HP em sua cidade, com o serviço de coleta de lixo ou com a loja em que o produto foi adquirido.

Slovak

Likvidácia vyradených zariadení v domácnostiach v Európskej únii

Symbol na výrobku alebo jeho balení označuje, že daný výrobok sa nesmie likvidovať s domovým odpadom. Povinnosťou spotrebiteľa je odovzdať vyradené zariadenie v zbernom mieste, ktoré je určené na recykláciu vyradených elektrických a elektronických zariadení. Separovaný zber a recyklácia vyradených zariadení prispieva k ochrane prírodných zdrojov a zabezpečuje, že recyklácia sa vykonáva spôsobom chrániacim ľudské zdravie a životné prostredie. Informácie o zberných miestach na recykláciu vyradených zariadení vám poskytne miestne zastupiteľstvo, spoločnosť zabezpečujúca odvoz domového odpadu alebo obchod, v ktorom ste si výrobok zakúpili.

Slovenian

Odstranjevanje odslužene opreme uporabnikov v zasebnih gospodinjstvih v Evropski uniji

Ta znak na izdelku ali njegovi embalaži pomeni, da izdelka ne smete odvreči med gospodinjske odpadke. Nasprotno, odsluženo opremo morate predati na zbirališče, pooblaščeno za recikliranje odslužene električne in elektronske opreme. Ločeno zbiranje in recikliranje odslužene opreme prispeva k ohranjanju naravnih virov in zagotavlja recikliranje te opreme na zdravju in okolju neškodljiv način. Za podrobnejše informacije o tem, kam lahko odpeljete odsluženo opremo na recikliranje, se obrnite na pristojni organ, komunalno službo ali trgovino, kjer ste izdelek kupili.

Spanish

Eliminación de residuos de equipos eléctricos y electrónicos por parte de usuarios particulares en la Unión Europea

Este símbolo en el producto o en su envase indica que no debe eliminarse junto con los desperdicios generales de la casa. Es responsabilidad del usuario eliminar los residuos de este tipo depositándolos en un "punto limpio" para el reciclado de residuos eléctricos y electrónicos. La recogida y el reciclado selectivos de los residuos de aparatos eléctricos en el momento de su eliminación contribuirá a conservar los recursos naturales y a garantizar el reciclado de estos residuos de forma que se proteja el medio ambiente y la salud. Para obtener más información sobre los puntos de recogida de residuos eléctricos y electrónicos para reciclado, póngase en contacto con su ayuntamiento, con el servicio de eliminación de residuos domésticos o con el establecimiento en el que adquirió el producto.

Swedish

Bortskaffande av avfallsprodukter från användare i privathushåll inom Europeiska Unionen

Om den här symbolen visas på produkten eller förpackningen betyder det att produkten inte får slängas på samma ställe som hushållssopor. I stället är det ditt ansvar att bortskaffa avfallet genom att överlämna det till ett uppsamlingsställe avsett för återvinning av avfall från elektriska och elektroniska produkter. Separat insamling och återvinning av avfallet hjälper till att spara på våra naturresurser och gör att avfallet återvinns på ett sätt som skyddar människors hälsa och miljön. Kontakta ditt lokala kommunkontor, din närmsta återvinningsstation för hushållsavfall eller affären där du köpte produkten för att få mer information om var du kan lämna ditt avfall för återvinning.

Glossary

ACP	Array control processor.
AL	Arbitrated loop.
AL-PA	Arbitrated loop physical address.
allocation	The ratio of allocated storage capacity versus total capacity as a percentage. Allocated storage refers to those logical devices (LDEVs) that have paths assigned to them. Allocated storage capacity is the sum of the storage of these LDEVs. Total capacity is the sum of the capacity of all LDEVs on the disk array.
array group	A group of four or eight physical hard disk drives (HDDs) installed in an XP array and assigned a common RAID level. RAID1 array groups consist of four (2D+2D) or eight HDDs (4D+4D). RAID5 array groups include a parity disk, but also consist of four (3D+1P) or eight HDDs (7D+1P). All RAID6 array groups are made up of eight HDDs (6D+2P).
BC	HP Business Copy. An HP StorageWorks application that lets you maintain up to nine local copies of logical volumes on the disk array.
cache	Very high speed memory that is used to speed I/O transaction time. All reads and writes to the XP array family are sent to the cache. The data is buffered there until the transfer to/from physical disks (with slower data throughput) is complete. The benefit of cache memory is that it speeds I/O throughput to the application. The larger the cache size, the greater the amount of data buffering that can occur and the greater throughput to the applications. XP arrays support a range of cache memory. In the event of power loss, battery power maintains the contents of cache for a specified time period.
CAS	Customer Access System.
CHA	Channel adapter. A device that provides the interface between the array and the external host system. Occasionally, this term is used synonymously with the term channel host interface processor (CHIP).
CHIP	Channel host interface processor. Synonymous with the term CHA.
CHP	Channel processor. The processors located on the CHA. Synonymous with CHIP.
command device	A volume on the disk array that accepts HP StorageWorks Continuous Access or HP StorageWorks Business Copy control operations which are then executed by the array.
Continuous Access	The HP StorageWorks XP Continuous Access program, which enables you to replicate data stored on a local disk array to a remote disk array.
control unit	To organize the storage space attached to the DKC, you can group similarly configured LDEVs with unique CU images. CUs are numbered sequentially. The

	disk array supports a certain number of CUs, depending on the disk array model. Each CU can manage multiple LDEVs. Therefore, to uniquely identify a particular LDEV requires both the CU number and the LDEV number.
CSR	Customer Self Repair.
C-Track	Continuous track. An HP StorageWorks software program that detects internal hardware component problems on a array and automatically reports them to the HP Storage Technology Center (STC).
CU	Control unit.
CVS	Custom volume size. CVS devices (OPEN-x CVS) are custom volumes configured using array management software to be smaller than normal fixed-size OPEN system volumes. Synonymous with VSC.
disk group	A named group of disks selected from all the available disks in a disk array. One or more virtual disks can be created from a disk group. Also refers to the physical disk locations associated with a parity group.
disk type	The manufacturing ID written into the physical disk controller firmware. In most cases, the disk type is identical to the disk model number.
DKA	Disk adapter. *See also* ACP
DKC	Disk controller.
DKU	Disk array frame. The array hardware that houses the disk array physical disks.
DRR unit	Disk recovery and restore unit. The unit responsible for data recovery and restoration in the event of a cache failure. Located on the ACP.
emulation mode	The LDEVs associated with each RAID group are assigned an emulation mode that makes them operate like OPEN system disk drives. The emulation mode determines the size of an LDEV. OPEN-3: 2.46 GB OPEN-8: 7.38 GB OPEN-9: 7.42 GB OPEN-E: 13.56 GB OPEN-K: Not available OPEN-L: 36 GB OPEN-M Not available OPEN-V: User-defined custom size
EPO	Emergency power-off.
ESCON	Enterprise systems connection An optical interface used to connect the mainframe to the control unit; a predecessor to FICON.
expanded LUN	A LUN is normally associated with only a single LDEV. The LUN Size Expansion (LUSE) feature allows a LUN to be associated with 2-36 LDEVs. Essentially, LUSE makes it possible for applications to access a single large pool of storage. LUSE is an optional feature.
ExSA	Extended serial adapter.

failover An operation that reverses replication direction so that the destination becomes the source and the source becomes the destination. Failovers can be planned or unplanned and can occur between DR groups, managed sets, fabrics or paths, and array controllers.

FC Fibre Channel. A network technology primarily used for storage networks.

FC-AL Fibre Channel arbitrated loop.

FCP Fibre Channel protocol.

fence level A method of setting rejection of P9000 or XP Continuous Access write I/O requests from the host according to the condition of mirroring consistency.

FICON Fibre connectivity. Hardware that connects the mainframe to the control unit.

FSW Fibre switch.

GLM Gigabit link module. A 1 Gb/s fiber optic transceiver.

HA High availability.

HBA Host bus adapter. A built-in function or a card installed in a PC or other host computer to enable connection of the host to the SAN.

HDD Hard disk drive.

HDU Hard disk unit.

host mode Each port can be configured for a particular host type. These modes are represented as two-digit hexadecimal numbers. For example, host mode 08 represents an HP-UX host.

hot standby The act of using one or more servers (or disks) as a standby in case of a primary server (disk) failure.

LD, LDEV Logical device. An LDEV is created when a RAID group is carved into pieces according to the selected host emulation mode (that is, OPEN-3, OPEN-8, OPEN-9). The number of resulting LDEVs depends on the selected emulation mode. The term LDEV is also known as *term volume*.

local disk A disk in the local array. Sometimes refers to a disk in a local host.

LUN Logical unit number. A LUN results from mapping a SCSI logical unit number, port ID, and LDEV ID to a RAID group. The size of the LUN is determined by the emulation mode of the LDEV, and the number of LDEVs associated with the LUN. For example, a LUN associated with two OPEN-3 LDEVs has a size of 4,693 MB.

LUSE Logical Unit Size Expansion. The LUSE feature is available when the HP StorageWorks LUN Manager product is installed, and allows a LUN, normally associated with only a single LDEV, to be associated with 1 to 36 LDEVs. Essentially, LUSE makes it possible for applications to access a single large pool of storage.

MCU Main control unit.

mirroring consistency	The consistency (usability) of data in a volume (for example, S-VOL).
MIX	A circuit board in the disk control unit that includes disk adapters and channel adapters for interfacing disk drives and the host to cache memory.
MR	Magnetoresistive.
ms, msec	Millisecond.
mutual hot standby system	Two servers that are poised to cover for each other if necessary.
NAS	Network attached storage.
node	Logically speaking, an environment where instances can be executed. Physically, a processor, which is an element of a cluster system.
NVS	Nonvolatile storage.
OFC	Open Fibre Control.
OLM	Optical link module.
OLM	Optical link module.
PA	Physical address.
partition	The act of dividing a specific physical disk into two or more areas as if there are two or more physical disks.
path	A path is created by associating a port, a target, and a LUN ID with one or more LDEVs. Also known as a *LUN*.
PCI	Peripheral component interconnect. The PCI bus typically runs at speeds of 33 MHz or 66 MHz and is usually 32 bits wide. This means that it passes 32 bits of data simultaneously as if down 32 separate wires. Some of the most recent computers include wider 64-bit PCI buses, and already certain very high-end video capture cards offer improved performance if connected to a 64-bit PCI bus.
port	A physical connection that allows data to pass between a host and the disk array. The number of ports on an XP disk array depends on the number of supported I/O slots and the number of ports available per I/O adapter. The XP family of disk arrays supports FC ports as well as other port types. Ports are named by port group and port letter, such as CL1-A. CL1 is the group, and A is the port letter.
P-P	Point-to-point.
RAID group	A group of disks configured to provide enhanced redundancy, performance, or both. Specifically, four or eight physical hard disk drives (HDDs) installed in an XP disk array and assigned a common RAID level.
RAID level	A RAID level is one of the ways that disk drives are grouped together to improve performance, data availability/reliability, or both. RAID levels are defined from RAID0 to RAID6. HP StorageWorks Disk Arrays in the XP product family support RAID1, RAID5 and RAID6. Not all of these RAID levels are supported by all XP

	family members. Consult the owner's guide or your HP representative for the details about which RAID levels are supported by your specific XP disk array.
RS	Russellstoll (registered trademarked), a brand of electrical plugs and receptacles manufactured by Thomas & Betts Corporation.
R-SIM	Remote service information message.
R/W, r/w	Read/write.
SAN	Storage area network. A network of storage devices available to one or more servers.
script file	A file containing a shell script.
shell script	A sequence of two or more commands executed by a UNIX shell.
sidefile	An area of cache used to store the data sequence number, record location, record length, and queued control information.
SIM	Service information message.
SMI-S	Storage Management Initiative Specification.
SMS	System Managed Storage.
SPOCK	HP StorageWorks Single Point of Connectivity Knowledge.
SSID	Subsystem identifier; storage system identifier.
STC	HP Storage Technology Center.
SVP	Service processor. A notebook computer built into the disk array. The SVP provides a direct interface to the disk array and used only by the HP service representative.
TB	Terabyte. Equivalent to 1,000 Gb for data storage and statistics, or 1,024 Gb for memory.
TID	Target ID.
VOLID	Volume ID.
VSC	Volume size customization. Also known as *CVS*.
volume	Synonymous with LDEV.

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